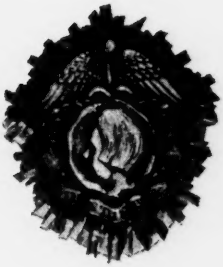
Journal of Dentistry for Children



THIRD QUARTER 1950

Journal of Dentistry for Children

PUBLISHED BY THE AMERICAN SOCIETY
OF DENTISTRY FOR CHILDREN

ALFRED E. SEYLER, D.D.S., F.A.C.D., *Editor*
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Detroit 15, Michigan

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Issued quarterly in February, April, July, and October at Mt. Royal and Guilford Aves., Baltimore 2, Md. Subscription price $3.00 per volume (4 issues); to members of the A.S.D.C. and libraries $2.00 per volume, single copies, 75¢. Changes of address should be sent to the Editor. Application for entry as second class matter pending at Baltimore, Md.

Publication in the Journal of Dentistry for Children is not to be taken as an endorsement by the Publishers, the Editors or the Editorial Board

Vol. XVII **THIRD QUARTER** **1950**

CONTENTS

Program—1950 Meeting 1–3
Your Community Too Can Have a Dental Health Program 4
Robert Kirschbaum, A.B., D.D.S.
Around the Country 7
Conducted by Paul Sydow
Handling the Parent of the Difficult Child Patient 9
Louis B. Kelsten, D.D.S.
Topical Anesthesia in Dentistry for Children 13
John E. Zur, B.S., D.D.S.
Space Maintenance in the Primary Dentition 21
Hugh M. Kopel, B.S., D.D.S., M.S.
Hemostasis: Applications in Dentistry 33
Robert D. Mercer, M.D.
Secretary's Message 43
Unit News 44
Conducted by Mel Noonan
Carbohydrate Evaluation 47

Nineteenth Annual Meeting

American Society of Dentistry for Children

ATLANTIC CITY, NEW JERSEY

October 27, 28, and 29, 1950

THE AMBASSADOR HOTEL

PROGRAM

FRIDAY, OCTOBER 27th—Room 125

8:00 P.M.—Meeting of Executive Council. W. James Taub, President, Presiding.

SATURDAY, OCTOBER 28th—Room 125

9:30 A.M. to 12 Noon—Meeting of Executive Council together with delegates from State Units. Hugo M. Kulstad, President-Elect, Presiding.

SATURDAY, OCTOBER 28th—"22 Club" Rooms

1:30 P.M. to 5:30 P.M.—Scientific Program. (Details under "Scientific Program.")

SUNDAY, OCTOBER 29th—Venetian Room

10:00 A.M. to 12:30 P.M.—Table Clinic Session. (Presenting 21 outstanding pedodontic table clinics.) (Details under "Table Clinic Session.")

2:00 P.M. to 5:30 P.M.—General Business Session and Election of Officers.

7:00 P.M. Dinner (informal)

Panel discussion "Should Auxiliary Personnel be trained for the Practice of Dentistry for Children?"

Moderator: Dr. Gerald D. Timmons, Dean School of Dentistry, Temple University, Philadelphia, Pa.

Participants: John T. Fulton, Dental Consultant, Children's Bureau, Federal Security Agency, Washington, D. C.

Allen O. Gruebbel, Secretary, Council of Dental Health, A. D. A., Chicago, Ill.

Paul K. Losch, Associate Professor, Dental Pediatrics, School of Dental Medicine, Harvard University, Boston, Mass.

J. Ben Robinson, Dean, Baltimore College of Dental Surgery, University of Maryland, Baltimore, Maryland.

Members of the American Dental Hygienists Association will be with us and wives and Dental Assistants are cordially invited as well.

Program Committee: M. Michael Cohen, Raymond Werther, Harold R. Klein and Gertrude Tank, Chairman.

Local Arrangements Committee: Maxwell Fogel, Morris Kelner, Lawrence Burdge and John K. Heindel, Sidney I. Kohn, Co-Chairmen.

General Advisory Chairman: J. M. Wisan.

All sessions will be held at the Ambassador Hotel

American Society of Dentistry for Children
Annual Meeting
ATLANTIC CITY, NEW JERSEY ★ THE AMBASSADOR HOTEL
October 27, 28, and 29, 1950

SCIENTIFIC PROGRAM

Saturday, October 28th—1:30 P.M. to 5:30 P.M.
"22 Club" Rooms

FIRST SECTION
FILLINGS FOR PRIMARY TEETH

Chairman: Dr. Paul K. Losch, Associate Professor of Dentistry, Harvard University, Boston, Mass.
Essayist: Dr. George W. Teuscher, Professor of Pedodontics, Northwestern University, School of Dentistry, Chicago, Ill.
Subject: Amalgam Restorations.
Essayist: Dr. Harold Kane Addelston, Professor of Dentistry for Children, New York University, College of Dentistry, New York, N. Y.
Subject: Gold Inlays for the Primary Dentition.

SECOND SECTION
PULP TREATMENT FOR CHILDREN

Chairman: Joseph J. Obst, M.A., D.D.S., F.A.P.H.A., Brooklyn, N. Y. Past-President, New York State Society of Dentistry for Children.
Essayist: Dr. S. N. Rosenstein, Professor of Dentistry, Department of Pedodontics, Columbia University School of Dentistry, New York, N. Y.
Subject: Conservation of Children's Teeth with Exposed Pulps.
Essayist: Helmut A. Zander, D.M.D., D.D.S., M.S., Boston, Mass.
Subject: Indications for Pulpotomy in Children.
Biography: D.M.D., University of Wuerzburg; D.D.S., Northwestern University Dental School, 1938; M.S., from Northwestern University Dental School, 1940; Professor of Oral Pediatrics and in charge of Post-graduate Education for Children's Dentistry at Tufts College Dental School. Councilor of the Boston Section for International Association for Dental Research. In charge of various major research projects in the field of material and drugs used in dentistry. Special Consultant to the U. S. Public Health Department.
Essayist: Samuel Seltzer, D.D.S., Philadelphia, Pa.
Biography: Graduate of University of Pennsylvania Dental School, 1937; entered U. S. Army April 1941, relieved from active duty February, 1946, as Lieut. Colonel; returned to staff of University of Pennsylvania Dental School in 1948 in the Department of Operative Dentistry; engaged in several research projects in the field of endodontics and published many papers on the subject of endodontics and drugs used in dentistry for children.
Subject: The Development of an Antibiotic Formula for Root Canal Therapy.

Sunday, October 29, 1950—10:00 A.M. to 12:30 P.M.
Venetian Room

TABLE CLINICS

1. Allen F. Weidman, D.D.S., Philadelphia, Pa., Associate Professor, Department of Oral Pathology, University of Pennsylvania.
   Subject: Histopathology in Children.
2. M. Michael Cohen, D.M.D., Boston, Mass. Lecturer in Stomatology at Tufts College Medical School. Instructor in Pediatrics, Tufts Medical School.
   Subject: Oral Pathology in Children.
3. Anna Mintz, D.M.D., Boston, Mass.
   Subject: Clinical Cases of Interest (Unsolved Problems).
4. Neal W. Chilton, D.D.S.; M.P.H., Trenton, N. J.
   Biography: Lecturer in Clinical Therapeutic and Pedodontics, New York University, College of Dentistry; Lecturer and Research Fellow in Dentistry, School of Dental and Oral Surgery, Columbia University Faculty of Medicine; Guest Lecturer in Oral Medicine and postgraduate Pedodontics, Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania; Guest Lecturer in Periodontia, Temple University School of Dentistry.
   Subject: Periodontal Disease in Children.

5. William J. Updegrave, D.D.S., F.A.C.D.
   Biography: Professor of Radiodontics—Temple University School of Dentistry; Past President, Pennsylvania Society of Dentistry for Children.
   Subject: Radiographic Technique for Children.
6. Martin F. Valentino, D.D.S., Brooklyn, N. Y.
   Biography: Assistant Professor at New York University, College of Dentistry (Dentistry for Children).
   Subject: Radiographs for Children and their Interpretation.
7. Dr. Mollie D. Foster, Pittsburgh, Pa., Associate Professor of Pedodontics, School of Dentistry, University of Pittsburgh, Pittsburgh, Pa.
   Subject: Factors which Influence Cavity Preparation in Primary Teeth.
8. Mark A. Wallach, B.S., D.D.S., New York, N. Y.
   Biography: Graduate of New York University, College of Dentistry, 1940; Staff of Guggenheim Clinic, 1940 to 1943. At present on staff of Department of Dentistry for Children at New York University College of Dentistry.
   Subject: Amalgam Restorations and Matrices for the Child.
9. Cannistraci, Andrew, D.D.S., New York, N. Y.
   Subject: Gold Restorations for Children.
10. Frank B. Gardner, D.D.S., Scranton, Pa.
    Biography: Graduate of University of Pennsylvania Dental School; President, Pennsylvania Society of Dentistry for Children, 1950–51.
    Subject: Direct Acrylics for Children.
11. Harold Berk, D.D.S., Boston, Mass.
    Biography: Graduate of Northwestern University, Dental School, 1941; Interne at Forsyth Dental Infirmary for Children, 1941–43; Instructor, Dentistry for Children, Tufts College Dental School; Consultant, Dentistry for Children, Beth Israel Hospital.
    Subject: Pulp Protection and Treatment of Fractured Anterior Teeth.
12. Harold R. Klein, D.D.S., New York, N. Y.
    Assistant Professor of Dentistry for Children, New York University, School of Dentistry, New York, N. Y.
    Subject: Pulp Treatment for Primary and Young Permanent Teeth.
13. I. B. Bender, D.D.S., Philadelphia, Pa.
    Instructor in Oral Medicine, University of Pennsylvania, Dental School.
    Subject: Antibiotic Treatment in Pulp Therapy for Children.
14. Frederick Sheire, A.B., D.D.S., M.S., Boston, Mass.
    Assistant Professor of Oral Pediatrics, Tufts College Dental School, Boston, Mass.
    Subject: Local Anesthesia in Dentistry for Children.
15. Neville A. Booth, D.M.D., Boston, Mass.
    Clinical Supervisor of Oral Surgery Department, Forsyth Dental Infirmary for Children.
    Subject: Minor Oral Surgery in Dentistry for Children.
16. Maxwell S. Fogel, D.D.S., Philadelphia, Pa.
    Biography: Staff Orthodontist, Community Health Center, Dental Dept., Philadelphia, Pa.
    Subject: Preventive Orthodontics.
17. Morris Kelner, D.D.S., Philadelphia.
    Biography: Graduate of Temple University School of Dentistry; Post-Graduate in Pedodontics, New York University, School of Dentistry, 1946-47; Pedodontist; Author of numerous papers on various phases of pedodontics.
18. Sidney Kronfeld, D.D.S., New York, N. Y.
    Biography: Graduate of New York University, College of Dentistry, 1935; Assistant Visiting Dental Surgeon at Gouverneur Hospital in New York City; Assistant Professor in Dentistry for Children at New York University College of Dentistry.
    Subject: Space Maintenance.
19. Raymond Werther, D.D.S., Philadelphia, Pa.
    Assistant Professor of Pedodontics, University of Pennsylvania, Dental School; Past President, Pennsylvania Society of Dentistry for Children.
    Subject: Space Maintenance.
20. Dental Guidance Council for Cerebral Palsy, Group Clinic, New York City.
    James Jay, D.D.S., Edward Heidt, D.D.S., Dr. Rizzolo, Dr. Stero.
    Subject: Dental Treatment of the Cerebral Palsied Child.
21. Herbert K. Cooper, D.D.S., Lancaster, Pa.
    Director, Lancaster Cleft Palate Clinic.
    Subject: Treatment of the Dentally Crippled Child (Cleft Palate). An Exhibit.

Your Community Too Can Have a Dental Health Program

ROBERT KIRSCHBAUM, A.B., D.D.S.
Newton Centre, Massachusetts

Editor's note:

Bob Kirschbaum is a member of our Mass. Unit, a graduate of Harvard College and N.Y.U. College of Dentistry. A goodly portion of his practice is devoted to children, and his efforts to make the community program described in this paper a success indicate his interest in dentistry for children is not a selfish one.

If you are interested in a relatively simple project for your own community, you'll find this a well-written article.

A.E.S.

IN HIS recent article in the Journal of the American Dental Association (1) Dr. John W. Knutson, chief of the Dental Division of the U.S. Public Health Service, explained that the real purpose behind the nationwide topical fluoride program is to stimulate the establishment of permanent community fluoride programs. The Committee on Appropriations, House of Representatives, recommended on April 27, 1948 the appropriation of one million dollars to enable the Public Health Service to set up a nationwide program for demonstrating the efficacy of topically applied sodium fluoride as a preventive against tooth decay.

The program was to consist of the establishment of field demonstration units to operate in the States under a close cooperative arrangement with State health departments, dental societies, and other organizations. The purpose of these mobile units would be to demonstrate to dentists, dental hygienists, State and local health department personnel, etc., the correct technic of applying sodium fluoride to the teeth; to train Public Health personnel; and to publicize and promote interest in the procedure. At the present time these units are operating in thirty-five states and territories, including Alaska, Hawaii, Puerto Rico, and the District of Columbia. More states will be included as soon as equipment and personnel are available. These units have been very well received and local groups of dentists, school and health officials, parent-teacher associations, and the general public have been very cooperative As a result much interest in dental health has been stimulated.

However, Congress and the United States Public Health Service regard this entire demonstration program as temporary. It is not aimed at having the teeth of every child in the United States treated by the personnel of these mobile dental units. It is not even the intention to treat each child in the community which the unit visits. This would be impossible in many localities, since each unit is assigned to a community for not longer than six weeks. The program is intended to arouse so much interest in dental health that the local citizens will establish their own community dental health programs. In this respect, it is the responsibility of the local dentists to direct these well-intentioned

citizens properly, for the dentists are most acquainted with the difficulties which will be encountered.

Among these difficulties will be the decision as to which children in the community will be treated under the program; what will be the age limit of the children treated; what will be the charge for treatment, if any; where will the money come from to operate this community dental program; and where will the treatment be given, in private dental offices or in a clinic. In addition to the sodium fluoride treatments, at the same time it is possible to establish a community dental health program in which restorative dentistry and extractions may be performed for children who otherwise would be neglected. It might even be possible to make orthodontics available to children whose parents cannot affort the benefits of this phase of dentistry.

The subject of a community dental health program is one with which I am familiar, for I have been the school dentist in the town of Foxboro, Massachusetts since 1946. I would like to describe how the program functions in Foxboro, with the hope that it may serve as an aid in the establishment of programs in other communities.

Foxboro is a town of about five thousand people in which the children attend six elementary schools and a combined junior and senior high school. The school dental clinic was established in 1930 by the Foxboro Women's Club and other local civic groups. The original equipment was purchased with money contributed by private individuals. It is now supported by the Community Chest.

Since I assumed charge of the clinic the following procedure has been in effect. At the beginning of each school year the dentist and the school nurse examine with mouth mirrors and explorers the teeth of every school child. The children are told of condition of their teeth and are urged to visit their family dentists to have the necessary treatment performed. Slips are then sent home to the parents informing them that their child's teeth were examined by the school dentist and that fillings, extractions, or cleanings are needed, as the case may be.

In the lower grades, before each classroom of pupils is examined, the school nurse informs the children that the school dentist is going to examine their teeth, so that they will know what to expect. After the class is examined the dentist returns to the classroom with the children and has a talk with them, explaining what cavities are and how they may be prevented. Oral hygiene, proper diet, and fluorine treatments are also discussed. It is felt that the time devoted to the education of the children in good dental habits is well-spent and one of the most important features of the entire program. The children are again urged to visit their family dentist so that their teeth may be put into good condition and so that each child might have his name placed on the Dental Honor Roll, which the teacher keeps.

In addition to the slip to the parents calling attention to the needed dental treatment, a permission card is sent home with the children in the first four grades. This card is signed and returned by the parents if they wish to have their children treated by the school dentist in the school dental clinic, and gives permission for the use of local anaesthesia. A charge of fifty cents is made for each operation performed.

We have limited our treatment at the school clinic to the pupils in the first four grades because we found that this group

alone supplies as many children as the clinic can handle in one day each week. We also feel that once a child has been made familiar with dental treatment at the school clinic he will continue to visit his family dentist when he exceeds the clinic age.

Our clinic which is in a school building consists of a large operating room and a smaller waiting room, equipped with chairs, tables, games, and children's coloring and story books. We were very fortunate last year in having the Foxboro Lion's Club donate a dental chair and cuspidor, a wall-type engine, and a light. We also have a portable dental chair which is used when the children are examined in the outlying schools at the start of the school term.

The school nurse selects those children who are most urgently in need of treatment and they are transported to the clinic in school buses. We have found that the children are very cooperative, especially when they know that their schoolmates are outside in the waiting-room and can hear what is going on in the operating room. While the children are waiting to come into the dentist, the nurse keeps them occupied with jig-saw puzzles, coloring books and story books.

The citizens of Foxboro are very proud of their school dental clinic and have been most cooperative. The local newspaper has helped to publicize our work and was especially helpful in launching our fluoridation program. The Lion's Club staged a newspaper and fat-collection campaign to raise money for our dental equipment. A committee of women was formed to look after the needs of the clinic. The school officials and local physicians and dentists have helped us on many occasions, and the school physician is always ready to lend a helping hand.

This is the manner in which the people of Foxboro have attempted to make dental treatment available to the children in their town. They recognized the need several years ago and did something about it. The Foxboro program is certainly not the most elaborate or extensive dental health program in the country. Many children are not able to be treated at the clinic in the time available. The money necessary to keep the clinic in existence is not plentiful. The clinic does not function during school vacations. Oftentimes treatment cannot be as extensive as desired because of the number of children to be treated. However, the clinic performs one function which is probably more important than any other. It makes every child conscious of his teeth and aware of the fact that he must take care of them. And it does make some dental care available to every child in the town.

I hope the Foxboro dental health program will help in the formation of other community programs. Certainly the need exists elsewhere, and in spite of the many difficulties encountered in a work of this nature, the satisfaction obtained from helping these youngsters more than makes up for them. Nobody can expect the dental profession to accept the entire burden of solving the problem of lack of dental care for children, but the dentist is certainly the person best informed and best equipped to get his community to do something about the problem.

REFERENCE

1. *J. A. D. A.*, **39:** #4, October, 1949, page 438.

634 Commonwealth Avenue

Around the Country

Under the guiding hand of Dr. Robert Denny, the city of Milan, Tennessee is to start fluoridating its municipal water supply in the near future. This procedure for cities throughout the state has been approved by the Public Health Council of the State Health Department.

* * *

Dr. Hiram Laws III, ex-president of the Tennessee Unit and Dr. C. L. Sebelius of Nashville have been appointed by Governor Browning to the State Committee for the Midcentury White House Conference on Children and Youth.

* * *

Dr. Harry Bruce of Chattanooga will soon be back with the Tennessee Department of Public Health after a profitable year of study leave at the University of Michigan.

* * *

Dr. F. N. Weber of the University of Tennessee has been busy on the lecture circuit speaking on his favorite subject of preventive orthodontics.

* * *

John Holland has accepted the assignment as head of the newly formed department of pedodontics at St. Louis University School of Dentistry. John will also continue his private practice for the time being.

* * *

Joe Hartsook of Ann Arbor turned out to be quite a "promoter" at Lincoln, Nebraska! Seems as tho' Joe wanted to have a party so he called all his friends and acquaintances in the Cornhusker Hotel about midnight and invited them to a certain room—not his—for refreshments! It was a good thing Al Seyler had a couple quarts of milk sent up for the boys, or most of them would have missed the call for breakfast!

* * *

Congratulations to Sam Harris of Detroit, who was elected President of Carnegie International—the personality development program of Dale Carnegie! Sam has been winning friends and influencing people for years, and we're happy to see that ability of his receive recognition!

* * *

Ed Mack of our Northern California Unit reports that Bernard Dietz, as Chairman of the Section on Dentistry for Children, did a masterful job at the California State Meeting, seeing to it that plenty of time was given to that subject.

* * *

Seen at Lincoln, Nebraska, during the Academy meeting: Ruth Martin and Cornelia Thompson teaching Al Seyler some new dance steps—Elsie Schildwater in another of those big hats—pretty, too!—Earl and Carol Lampshire hosting a group around Lincoln, pointing out the site of their new ranch home—Paul Sydow and Mel Noonan taking turns dancing with a pretty blonde airlines hostess—wonder who fixed that up for them?—Dave Law, Alex Bell and Clarence Coleman from Washington talking about Alex' thousand dollar hit on the roulette wheel—John Clayton from K.C. looking handsomer every year—Hal Addelston and Ross Scharfenberg debating the merits of

Scotch versus Bourbon—black coffee won —Walter McBride and Claude Bierman outdoing each other sartorially—Frank Lamons and associate Mary Lynn Morgan playing hosts to all the group at a swell cocktail party—Sam Stulberg and Joe Cabot trying to get away from Joe Hartsook's party, unsuccessfully!—Corvin Stine and Paul Taylor heading for bed at 9:30—Feno Shafer and the Mott Erwins sampling Nebraska milk shakes in the Campus Cowshed—Rex Waggoner showing Mel Noonan and Hugh Kopel how to address a golf ball—how that guy can swing!—Charlie Sweet making new friends with his easy-going affability—Mary Martin and her cute young daughter taking in the department stores—Dean Hooper playing a good host to everybody—Raf and Mrs. Ireland doing the same at the cocktail party at their beautiful home in Lincoln's exclusing suburbs, aided by Charlie Delio, Ed Hibbard, and Herman Chan—Smith Pettit from Ohio State trying to get a bet on O.S.U. as champions of the Big Ten next year—Ray Werther of Philadelphia agreeing with Pittsburg's Hagan that Pabst Blue Ribbon just hits the spot!!

* * *

Hugh McLaren, formerly a member of our Michigan Unit, now a Dental Health Officer of the Dominion at Ottawa, Canada, spoke before the 1950 Ontario Dental Convention on "What is Being Done in Dental Health in Canada"

* * *

Dean Roy Ellis, of the Faculty of Dentistry, Toronto, spoke to the several dental societies of Northern Ontario under the auspices of the Extramural Lecture Service of the Faculty this Spring. His subject, illustrated with slides, was "The Child Patient, the General Practitioner, and the Future", and since Roy was in his usual friendly form, his audiences were enthusiastic and interested in his presentation.

* * *

Earl Crumpton, D.M.D., M.S., a graduate of Ken Easlick's course now is practicing in Maryville, Tennessee. Earl and Mrs. Crumpton recently were presented with a second son.

* * *

Robert L. Heinze, Program Committee Chairman for the New York State Society of Dentistry for Children did an outstanding job in formulating the annual meeting on June 6.

* * *

The New York Unit had another outstanding and successful season. Joseph J. Obst as President, deserves commendation.

* * *

Dave Webber of Springfield, Massachusetts is doing excellent work with children in his practice. Dave also spends one day each week with Dr. Zander at Tufts.

* * *

Items of interest for this column may be sent to Dr. Paul Sydow, Framingham Mass.

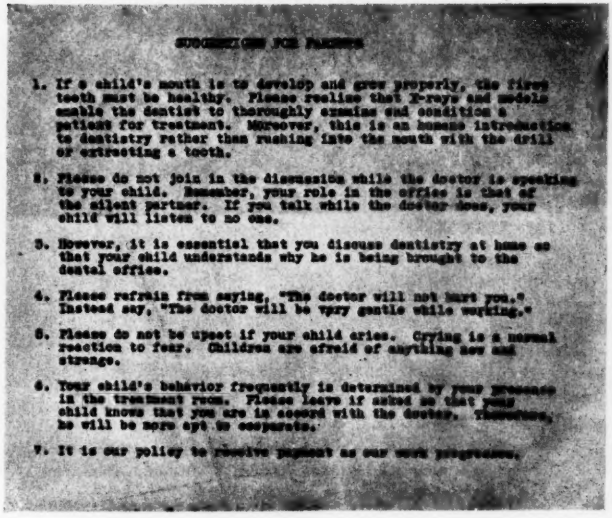
Handling the Parent of the Difficult Child Patient

LOUIS B. KELSTEN, D.D.S.*
Newark, New Jersey

TOO often parents are the cause of their children being difficult patients. Besides being uninformed, parents can be misguided by relatives and neighbors and by certain irresponsible dentists who minimize the need of dentistry for children. As a result, when pain and infection caused by neglect force a return visit to a dental office, this type of parent is a barrier to the treatment necessary for the youngster.

* Director of Children's Dental Section, Beth Israel Hospital, Newark, New Jersey.

At this time, attempting to educate a skeptical parent is time-consuming and often futile. However, this trying situaton can be alleviated if suggestions typewritten in a compact manner (Figure 1) so that they can be quickly read are handed to the parent before the child enters the treatment room. This approach has proved helpful because it is time-saving and because the printed word is more readily heeded.



SUGGESTIONS FOR PARENTS

1. If a child's mouth is to develop and grow properly, the first teeth must be healthy. Please realize that X-rays and models enable the dentist to thoroughly examine and condition a patient for treatment. Moreover, this is an humane introduction to dentistry rather than rushing into the mouth with the drill or extracting a tooth.

2. Please do not join in the discussion while the doctor is speaking to your child. Remember, your role in the office is that of the silent partner. If you talk while the doctor does, your child will listen to no one.

3. However, it is essential that you discuss dentistry at home so that your child understands why he is being brought to the dental office.

4. Please refrain from saying, "The doctor will not hurt you." Instead say, "The doctor will be very gentle while working."

5. Please do not be upset if your child cries. Crying is a normal reaction to fear. Children are afraid of anything new and strange.

6. Your child's behavior frequently is determined by your presence in the treatment room. Please leave if asked so that your child knows that you are in accord with the doctor. Therefore, he will be more apt to cooperate.

7. It is our policy to receive payment as our work progresses.

FIG. 1

Suggestions For Parents

1. If a child's mouth is to develop and grow properly, the first teeth must be healthy. Please realize that x-rays and models enable the dentist to thoroughly examine and condition a patient for treatment. Moreover, this is an easier introduction to dentistry rather than rushing into the mouth with the drill or extracting a tooth.
2. Please do not join in the discussion while the doctor is speaking to your child. Remember your role in the office is that of the silent partner. If you talk while the doctor does, your child will listen to no one.
3. However, it is essential that you discuss dentistry at home so that your child understands why he is being brought to the dental office.
4. Please refrain from saying, "The doctor will not hurt you." Instead say, "The doctor will be very gentle while working."
5. Please do not be upset if your child cries. Crying is a normal reaction to fear. Children are afraid of anything new and strange.
6. Your child's behavior frequently is determined by your presence in the treatment room. Please leave if asked so that your child knows that you are in accord with the doctor. Therefore, he will be more apt to cooperate.
7. It is our policy to receive payment as our work progresses.

Paragraphs 1 and 2 obviously require no explanation. Paragraph 3 is included because a child becomes more cooperative when he realizes that dental health means better appearance, growth, and development. Paragraph 4 prevents the parent from mentioning the word "hurt" which might arouse fear in the child. If told, however, that the doctor will be careful and gentle, the child will more willingly tolerate the unpleasant tastes and discomforts experienced during treatment. Even though difficult at first, through such conditioning, he can eventually become a better patient.

In the dental office a child may behave at a psychologic level below his chronologic age. A child of eight, for example, may behave like a four-year-old and must be treated accordingly.[1] Therefore, paragraph 5 reassures the parent and prevents the emotional disturbance and intervention that cause failure in handling children. Moreover, contrary to the opinion of many dentists, a child may cooperate more readily in the presence of a parent and it is wrong to make this type of child insecure by ordering the parent out of the treatment room.

However, where the child is unruly, he can be told that unless he behaves the parent must leave. Therefore, paragraph 6 shows how a child can be controlled simply by ordering the parent out of the treatment room. Then, if he promises to behave, the parent can return.[2] Thus the child, seeing that the parent is the ally of the dentist, is more apt to cooperate.

Although it is unsound to discuss fees prior to the analysis of the x-rays and study casts, it has been found that paragraph 7 assures payment for the roentgenograms at the initial visit and prepares the parent for accepting a payment schedule later. Thus the economic problem prevalent in doing dentistry for children is considerably eased.

[1] Massler, M., Associate Professor, Graduate Pedodontic Division, University of Illinois, Chicago, Illinois: Personal communication.

[2] Addelston, H. K., Associate Professor of Pedodontics, New York University Dental School: Lecture given at Children's Section, Jersey City Medical Center, Jersey City, N. J., October, 1948.

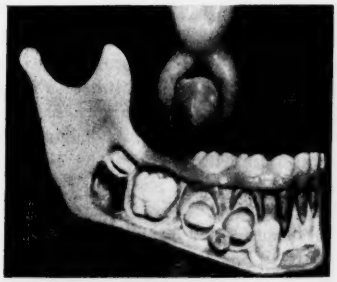


FIG. 2

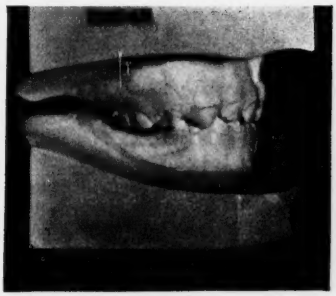


FIG. 3

After the parent has read the suggestions and the child is seated in the operating room, emergency treatment, if required, is quickly rendered. Where there is a pulpitis, Hogeboom's suggestion[3] of placing a pellet of cotton saturated in Fletcher's carbolized resin in the cavity, or where there is an acute periapical infection, Brauer's recommendation[4] of establishing drainage through the tooth with a sharp sterile instrument or a burr, bring speedy relief to a child in pain.

Then the parent can be shown Figure 2 which graphically reveals the need for roentgenograms. Besides locating hidden

[3] Hogeboom, Floyde E., *Practical Pedodontia*, p. 95. E. V. Mosby Company, St. Louis, 1946.

[4] Brauer, John C., *Dentistry for Children*, p. 383. Blakiston Company, Philadelphia, 1948.

FIG. 4

decay and infection (the parent is told), x-rays enable the dentist to find other abnormalities such as supernumerary and missing teeth which might seriously interfere with the development of the young jaws. After the need for x-rays is understood, where the child's mouth reveals a malocclusion, missing teeth, or considerable decay, the parent can be shown a set of study casts. Oral habits, teeth in supraocclusion (Figure 3), and "plunger" cusps which might break or drive restorations from the teeth are some of the facts learned from this important diagnostic aid. Impressions for the study models can be taken at the second visit.

Moreover, instead of having a stack of miscellaneous reading material in the reception room, dentists should keep carefully selected dental literature and maintain a bulletin board (Figure 4) upon which can be displayed bits of illustrated dental information. Since the dentist's time is limited, the reception room is a logical place for educating parents.

In conclusion, by establishing a phychologic bond with the parent through education and thorough diagnosis, the dentist can more readily render a complete service for the difficult youngster.

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Topical Anesthesia in Dentistry for Children

JOHN E. ZUR, B.S., D.D.S.
Chicago, Illinois

Editor's note:

For those of you who use topical anesthetics in your practice, as well as for those who are skeptical of its value, Dr. Zur's paper will be of interest, since it is a concise compiliation of facts and summary of clinical experiences. Dr. Zur obtained his M.P.H. degree from the University of Michigan in June. His B.S. degree is from Loyola of Chicago, and his D.D.S. from the University of Illinois in 1947.

A.E.S.

THE basis of much fear is the fear of pain itself. There is a distinct need in the practice of dentistry for children to develop safe and practical methods of depressing sensation in the teeth and gums so that dental work can be performed painlessly.

For those cases in which it is known that the pain of the procedure will be severe, an anesthetic is injected which will abolish pain completely. Such injections not always are accepted readily by the child patient, especially if he has had previous experience with injections for immunization purposes. Recognizing the patient's fear of an injection, dentists have employed drugs and combinations of drugs which would, in some measure, anesthetize the gum tissue or mucous membrane prior to the injection. The purpose of this paper is to review the literature and to evaluate the usefulness of the drugs suggested to obtain topical anesthesia.

REVIEW OF LITERATURE

The gums and mucous membrane of the mouth were not designed for absorptive purposes. Histological studies reveal that they are covered with stratified squamous epithelium many cell layers in depth. For an anesthetic to be of value when applied topically, it must penetrate the numerous layers of squamous cells rapidly enough to reach the nerve endings before the blood vessels and lymph channels carry it away, and it must reach the nerve endings in sufficient concentration to anesthetize these nerve endings. Furthermore, the drug employed should not be dangerously toxic to the patient, nor should its use result in severe irritation or induce sloughing of the tissue following its application.

The membranes of the mouth are constantly bathed with a thick viscid saliva and cannot be wet readily by liquids which are not miscible with water, unless special care first is taken to dry the surface. Since dilution of the drug with saliva will reduce its concentration, it is necessary to maintain a dry surface for the application of the solution and for a period of time sufficient for the solution to penetrate the epithelium satisfactorily.

In a review of the literature on topical anesthesia it appears proper to determine (1) if the common preparations used as topical anesthetics are safe to use in the mouth of a child; (2) if the use of any drug can be defended on the basis of the time involved for administration, and the depth or profoundness of the anesthesia that may be obtained.

Benzyl Alcohol

Accepted Dental Remedies (1) states that benzyl alcohol is an aromatic alcohol, synthetically produced. One cubic centimeter is soluble in 25 cubic centimeters of water, and it is miscible in all proportions with alcohol, ether and chloroform. It acts to produce a local anodyne effect causing brief local anesthesia. It is nontoxic in ordinary concentrations and doses. The recommended dosage for a non-irritating application is 4 per cent.

Tainter and Moose (2) report that in tests with 50 per cent benzyl alcohol in a 50 per cent concentration of ethyl alcohol, some anesthesia was caused in 79 per cent of the patients. Initial irritations, hyperemia and tissue sloughs were reported in some of the cases.

Saligenin

Saligenin (1) occurs as a white crystalline powder, permanent in air. It has a faint aromatic odor and produces a slight burning sensation followed by a sense of numbness when applied to the tongue. Saligenin is soluble in water and chloroform, freely soluble in alcohol and ether and also is soluble in the fixed and volatile oils.

Saligenin is a local anesthetic similar in general properties to benzyl alcohol and in action to procaine hydrochloride. The anesthesia produced lasts longer and for this reason the addition of a vasoconstrictor is not necessary. Weak solutions are relatively ineffective when applied to intact mucous membranes, but strong solutions exert a definite numbing effect. The recommended dosage for topical use is 10 per cent.

Tainter and Moose (2) report in their tests that a 30 per cent solution of alcohol was required to dissolve saligenin to the 10 per cent strength used. It failed altogether in only 3 per cent of the patients, produced complete local anesthesia in one-third of the patients, and was found to be irritating in one-third of the patients. The resulting 2 per cent sloughs observed probably were caused by the alcohol used as the solvent.

Ethyl Aminobenzoate—(Benzocaine)

Ethyl Aminobenzoate—(Benzocaine) (1) is a white crystalline powder odorless and tasteless. It is almost insoluble in cold water, soluble with difficulty in hot water, soluble in dilute acids, alcohol, ether, benzene, and fatty oils, and freely soluble in chloroform. This drug is used as a topical anesthetic both in the mouth and on the external surface of the skin. It should not be used in combination with sulfonamides since it inhibits their bacteriostatic action. The prescribed dosage of benzocaine is a 10 per cent solution.

Tainter and Moose (2) in their studies report that benzocaine is irritating in approximately one-third of the cases. The poor solubility of benzocaine in water necessitated the use of 70 per cent alcohol as a solvent, and, as a result there were sloughs in 12 per cent of the patients. They concluded that benzocaine had a fairly long action but should probably be eliminated because its use is associated with a very high incidence of sloughs. "If these sloughs could be avoided without diminishing the local anesthetic efficiency, benzocaine would approach the ideal among agents for topical anesthesia (3)."

Seldin (4) found that benzocaine required 70 per cent alcohol to obtain a 10 per cent solution. Alcohol in this concentration produces considerable tissue destruction, resulting in chemical burns and sloughing.

Ethyl Chloride

Ethyl chloride (1) is a colorless and very volatile liquid having an agreeable odor and a sweetish, burning taste. It is used in the form of a spray to produce local anesthesia by refrigeration.

Seldin (4) feels that ethyl chloride is best employed as a thin spray from the usual automatic nozzle directly upon the surface to be anesthetized, until there is a distinct whitening of the mucous membrane and the appearance of a frost. If the puncture is made immediately upon the formation of the white spot, it is certain to be quite painless. However, there are several disadvantages which detract from the value of this technic: 1. the freezing procedure may be painful to the teeth and gums; 2. the surrounding tissues should be protected by means of cotton rolls; 3. the vapors, if inhaled, are highly irritating; 4. the surface anesthesia produced is momentary and disappears almost immediately; 5. necrosis and sloughing of the gingival tissue may follow.

Phenol

Phenol (1) occurs as colorless needle-shaped crystals having a characteristic somewhat aromatic odor. When copiously diluted with water, it has a sweetish taste, with a slightly burning after-taste, and, when undiluted, cauterizes and whitens the skin and mucous membranes. Phenol is soluble in water (1:15) and is miscible with alcohol in all proportions. Phenol acts as a local anesthetic, but practically is not used as such because of its strong escharotic properties. When used in topical anesthesia the dosage is 5 per cent phenol in a 95 per cent alcohol solution.

Tainter and Moose (3) state that a 5 per cent solution of phenol in water had a definite local anesthetic action, causing about twice as much anesthesia as did the controls; but as this solution produced 9 per cent of sloughs, it was too toxic locally for the best effect. When the same strength of phenol was dissolved in 95 per cent alcohol, a very efficient local anesthetic resulted. There was complete anesthesia in 53 per cent of the patients and at least partial anesthesia in all of the remaining patients. The anesthetic action came on very promptly and persisted. However, this solution would be difficult to use routinely because it causes sloughs, or superficial necrosis, in 22 per cent of the patients. It is more potent in this respect than the aqueous solution.

Angelman (5) states that the escharotic action of phenol rapidly destroys the soft tissues. When applied to mucous membranes, the epithelial cells are quickly disintegrated and the degree of disintegration depends upon the quantity and concentration used. The anesthetic property lies in the rapid coagulation of the intra-epithelial and sub-epithelial nerve fibres. By virtue of its coagulant action it limits its own penetration. Unless the tissue to which it is applied is to be removed, the use of phenol as a surface anesthesia is contra-indicated.

Murless (6) advocates the use of a solution of cocaine and phenol which, when applied, "does not destroy the mucous membrane." He states that the two drugs limit each other to a desirable degree, namely the phenol is no longer escharotic, while at the same time the penetration of the cocaine is restricted to the surface tissues and its influence is purely local. He also states that a minute amount is necessary for topical anesthesia and thirty to sixty seconds is ample time for the application to become effective. After application the surface should be wiped with alcohol, followed by water, before the cotton rolls are removed. The alcohol acts

as a solvent both for the cocaine and the phenol, and water completes the removal.

Procaine Hydrochloride

Procaine hydrochloride (1) occurs as small white crystals or as a white crystalline powder. It is odorless and is stable in air. It is freely soluble in water (1:1) and soluble in alcohol (1:30).

Tainter (3) reports that a 20 per cent solution of procaine in water was found to be completely inactive since it causes no more anesthesia than the aqueous control solutions.

Dobbs (7) feels that procaine in a 20 per cent alkaline solution is probably the drug of choice for topical anesthesia.

Cullen (8) states that procaine is relatively ineffective when applied topically due to its short action.

Dobbs (9), while reporting before the International Association for Dental Research, stated that the efficacy of several accepted topical anesthetic drugs, on oral mucous membrane in students and clinical patients, was determined in uniform experiments. He stated that one of the three anesthetics, which when applied topically gave profound anesthesia, with no after-soreness, was a 20 per cent solution of novocaine hydrochloride in 10 per cent ethyl alcohol and 70 per cent water and the pH adjusted to 8.2.

Cocaine Hydrochloride

Cocaine hydrochloride (1) occurs in colorless prisms, flaky, lustrous leaflets or a white crystalline powder. It is very soluble in water (1 in 0.5) and freely soluble in alcohol (1 in 3.5). Cocaine was the first of the local anesthetics to be introduced into medicine and is said to exert a profound anesthetic action by topical application, instillation or infiltration. It is more toxic than most of the synthetic substitutes and not much more effective by injection, but usually more effective by topical application. Cocaine produces a variable local vasoconstriction, while the synthetic substitutes do not, but some vasoconstrictor drug, commonly epinephrine, usually is added to obtain the most efficient anesthesia along with a reduction of toxicity. Cocaine increases the local and systemic effects of epinephrine by sensitizing innervations. For this reason, undesirable reactions may be produced, especially on the circulation.

Tainter (3) reports that cocaine in one and five per cent solutions was somewhat disappointing. It produced slightly more anesthesia than the controls, but not enough to indicate any real usefulness. He concluded, since cocaine has an appreciable toxicity in concentrated solutions and is a habit-forming drug, that it should be eliminated from the armanentarium of topical anesthesia.

Cullen (8) states that, although cocaine is a good surface anesthesia, its great disadvantage is its high toxicity.

Angelman (5) maintains that cocaine in combination with phenol is contraindicated for use as a surface anesthetic. This combination quickly disintegrates the epithelial cells and, by virtue of coagulant action, the penetration of the drug is limited.

Leigh (10) states that because of the known toxicity of cocaine and the deaths reported from its use, other drugs have been used for topical anesthesia. Since it is well-known that cocaine, combined with epinephrine, is three or four times as toxic as cocaine alone and that it may produce ventricular fibrillation, this drug is contraindicated as a topical anesthetic when epinephrine is to be used.

Cocaine enhances the systemic effect of epinephrine which is particularly dangerous in patients with cardiac irregularities.

Seldin (4) feels that, even in doses con-

sidered to be too small to cause any abnormal effects, cocaine can produce all of the symptoms of acute poisoning in some patients. He states that cocaine is seven times as toxic as procaine.

Tutocain Hydrochloride (Butamin)

Tutocain hydrochloride (Butamin) (1) occurs as an ivory colored crystalline powder. It is practically odorless, possesses a faintly bitter taste, and produces a sense of numbness when applied to the tongue. It is easily soluble in water and difficultly soluble in alcohol. It is useful for surface and pressure anesthesia and, when correctly used, produces complete and prolonged anesthesia. Surface anesthesia develops more slowly than with cocaine, but is equally intense. For surface anesthesia of the gums, a 5 to 10 per cent solution is suggested.

Tainter (3) states that a 10 per cent solution of tutocaine in water was found to be completely inactive, since it caused no more anesthesia than the control solution.

Easlick (11) by clinical tests found a 10 per cent aqueous solution of tutocaine to be inadequate during a ten minute test.

Dobbs (9) reports that in uniform experiments a 20 per cent solution of tutocaine in 10 per cent ethyl alcohol and 70 per cent water, pH 8.3, produced profound anesthesia with no after-soreness.

Butacaine Sulfate (Butyn)

Butacaine sulfate (Butyn) (1) occurs as a white odorless, crystalline powder. It rapidly produces numbness when placed upon the tongue. It is slowly soluble in water and very soluble in warm alcohol. It has been used as a local anesthetic and has been proposed as a substitute for cocaine, particularly in surface anesthesia. It is claimed to have the special advantage of acting through intact mucosa more effectively than cocaine and of possessing about twice the anesthetic activity of cocaine. Its toxicity tends to be about the same as, or greater than, that of cocaine. The recommended dosage is a 10 per cent solution (12) in alcohol and water.

Tainter (3) states that butyn in 10 per cent solution was found to be the best of the ready prepared solutions tested. It caused local anesthesia in all but four per cent of the patients and was non-injurious to tissues at the site of application.

Cullen (8) states that butyn is a good surface anesthetic with rapid action and of long duration.

Dobbs (9) reports that in uniform tests a 10 per cent solution of butyn and 10 per cent ethyl alcohol and 80 per cent water produces profound anesthesia with no after-soreness.

Seldin (4) maintains that a 10 per cent solution of butyn and diluted alcohol makes a good topical anesthetic.

Chlorobutanol

Chlorobutanol (1) is a white, crystalline, volatile compound, possessing a somewhat camphoraceous odor and taste. It is soluble in water (1:125), in volatile oils, in glycerin and very soluble in alcohol, ether, glacial acetic acid, chloroform and acetone. The local anesthetic action of chlorobutanol is weaker than that of cocaine. Chlorobutanol, 10 per cent, in alcohol 45 per cent may be used as a topical anesthetic.

Tainter (2) used chlorobutanol in a 10 per cent concentration in 45 per cent alcohol. This solution showed a very high degree of anesthetic efficiency since anesthesia was produced in 98 per cent of the patients. The average duration of anesthesia was nine minutes. However, this drug was found to be irritating in approximately one-third of the patients, but the irritation was ascribed to the alcohol that

was used as a solvent. Its slight solubility in water requires the use of alcohol as a solvent. This combination is not practical since the alcohol will cause irritation.

Orthoform

Orthoform (1) occurs in a fine, white, crystalline powder, odorless and tasteless. It is almost insoluble in water, freely soluble in alcohol and soluble in ether. It is a local anesthetic, but it penetrates the tissues very slowly on account of its insolubility. It has no action on the unbroken skin. It is practically nontoxic in the usual doses.

Tainter (2) reports that a 10 per cent solution of orthoform was effective in 80 per cent of the patients, a result which was not much better than that obtained with 95 per cent alcohol, in which it was dissolved. Apparently, the orthoform did not add very much to the anesthetic efficiency of the solution. The application of this drug resulted in some irritation and hyperemia and caused sloughing of the tissue in 4 per cent of the cases. Tainter concludes that such irritant action is obviously a serious detriment to the use of such a solution.

Nupercaine

Nupercaine is a quinoline derivative and therefore not related to cocaine or procaine. It is obtained in the form of colorless crystals and is readily soluble in distilled water. The suggested dosage is a 2 per cent solution when used for topical application on the oral mucosa.

Barkann (13) has found that "nupercaine has many advantages for topical anesthesia, with no blanching or apparent vasodilatation, the color and texture remaining unchanged." Her experience with this drug has shown no unsatisfactory results such as discomfort, irritation or sloughing of tissue.

Cullen (8) states that nupercaine is a good anesthesia with long action. However, its high toxicity is a disadvantage for common usage.

Easlick (11) in testing an alkalinized 5 and 10 per cent solution found that the 10 per cent solution produced a deep anesthesia in eleven minutes which persisted after a forty minute period. The solution caused a severe burn and a large area of epithelium sloughed off from the mucolabial and mucobuccal fold. The 5 per cent solution, also alkalinized with sodium bicarbonate solution, did not produce adequate surface anesthesia in thirteen minutes, but did not blister. It may be concluded that with such a slow onset of anesthesia and the tissue irritation of this anesthetic, that its use would not be safe for oral application.

Tainter, Throndson and Moose (3) state that the time periods required for the onset of anesthesia, with the various solutions tested, averaged close to 3 minutes. The average duration of anesthesia with the weak agents was less than five minutes. With the stronger agents, there was a longer average duration of anesthesia: for cocaine, eight minutes; chlorobutanol, nine minutes; and saligenin and benzocaine, ten minutes. Their evaluation of the relative significance of this time factor is interesting since they state that it is extremely difficult to determine precisely the duration of anesthesia in tissues so insensitive as the gums.

Miscellaneous Anesthetics

Hartman's solution, which is composed of approximately 50 per cent ether, is not readily miscible in water. It was given wide acclaim as an anesthetic, which when applied to dentin, would eliminate the pain of mechanical drilling.

Hill (14) states that when finely divided carbon particles were added to Hartman's solution, its penetration of dentinal tu-

bules could be traced for only 0.05 mm. The theory had been advanced that the lipoids with the dental tubules play some part in the transmission of sensation, and that this solution, because it is a solvent of and is dissolved in lipoids, in some way changes the ability of the lipoids to transmit sensation.

Dobbs (7) states that Hartman's solution is the best dentin anesthetic he has studied, but finds that it is efficient in less than 40 per cent of the cases. He advocates its use in Class V preparations in children's teeth.

Two proprietaries, Phennol (15) and Perdentin (16), which consist of identical mixtures of 60 per cent benzyl alcohol and 40 per cent chloroform were given publicity in 1930 as the most efficient topical anesthetics ever produced. Since they represented an irrational and nonscientific mixture of local and general anesthetics, they were not accepted by the Council of Dental Therapeutics of the American Dental Association.

Fantazn (17), Num-dent (18), Prothesia (18), and Topanol (19) all contain essentially the same active ingredient, benzocaine, in combination with various solvents.

Stopain (19) consists essntially of 50 per cent guaiacol in glycerin. Guaiacol is an aromatic phenol derived from wood-tar. Easlick (11) found this combination did not produce a surface anesthesia during a ten minute test.

Neu-ora (20) was publicized as the most effective contact anesthetic on the market. The Bureau of Chemistry of the American Dental Association stated that this preparation consisted of a 14 per cent solution of cocaine in alcohol and essential oils. It also was found to contain 1/5000 epinephrin. As has been noted previously, the presence of epinephrin increases the toxicity of cocaine three or four times.

SUMMARY

The properties and actions of the more common drugs used as topical anesthetics have been reviewed in this paper and their actions now may be grouped and summarized.

Tainter and Moose have completed several studies of the efficacy of certain common topical anesthetics. At the request of the Council on Dental Therapeutics, in the Journal of the American Dental Association for February 1936, some of these findings will be found published. These investigators tested thirty-four solutions in a total of 2192 individual applications. A total of 933 observations were made with six aqueous solutions of various colors, tastes and odors, but containing no anesthetic. Complete anesthesia was reported in an average of eleven per cent of all the patients tested. Partial anesthesia was reported in an average of thirty-two per cent of all cases. A total of forty-three per cent of the patients tested were satisfied that there was some local anesthesia produced by the bland and inert solutions.

The observations of Tainter and Moose and those of a few other investigators have to be utilized as a basis to ascertain the merits or disadvantages of drugs commonly used as topical anesthetics. The drugs commonly used in topical anesthesia appear not to possess the ability to penetrate the many cell layers of the mucous membrane sufficiently to secure anesthesia when used in low concentration. Concentrations necessary to gain some degree of anesthesia must be so great that either the drug or its solvent damages the mucous membrane.

Benzyl alcohol, saligenin, benzocaine, ethyl chloride, chlorobutanol, phenol, orthoform and nupercaine were found to cause tissue irritation or sloughing in sufficient cases to make their use questionable.

Tutocain and Procain were designated as the drugs of choice by some investigators but were found to be ineffective by others. Although most investigators agreed that cocaine does have some anesthetic power, its disadvantages were sufficient to make it dangerous for oral use. Butyn was accepted in most cases as the drug that came closest to meeting the standards for a good topical anesthetic.

Conclusions

1. The conflicting observations of the various investigators of the topical anesthetics reviewed show that none of these drugs meet all of the requirements of safety and practicability.

2. Tainter (2), Easlick (23), Del Papa (22), and Hunnicut (21) agree that topical applications prior to injection of the needle may have some psychological value to the hypersensitive patient.

3. The need of a safe and practical topical anesthetic exists, and further studies to discover such a drug are indicated.

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The Space Maintenance Problem in the Primary Dentition

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Editor's note:

The accompanying article is not one to be read through hurriedly, for it presents many observations and figures which should be dwelt upon as they are read. The general practitioner more, perhaps, than the pedodontist and orthodontist, will be interested in the material and conclusions presented, for they can serve to provide him with sound adjuncts to his clinical conclusions as to the need for space maintainers.

The author is a member of our Michigan Unit, a graduate of the University of Detroit School of Dentistry, who after three years service in the Army, resumed his study in the Graduate School at Ann Arbor, obtaining his M.S. in Pedodontics in 1948.

Hugh now teaches in the U. of D. Children's Clinic, conducts a private practice devoted to pedodontics exclusively, and was recently married to Lillian Fuller, a young lady whose encouragement, pleasant personality and beauty tend to keep Hugh the active person he is. Since his fund of stories is unlimited, albeit somewhat corny, his friends enjoy his company, and he is a favorite among his students. We predict that Time will produce the leaven to raise Hugh to national prominence.

A.E.S.

THE dental profession appears not to have appreciated fully the need for, and the value of space maintenance during the period of the mixed dentition. Many scientific reports dealing with the growth and development of the teeth and jaws outline definitely the implications for space maintenance. In spite of the contributions of research workers which present the patterns of the potential interference with the growth and development of the human jaws, many practicing dentists appear derelict in their observation and treatment of the spaces which are due to the early loss of teeth, or to congenitally missing teeth. It would seem to be the responsibility of the general practitioner, as well as the specialist in pedodontics, to help guide a developing denture when the need arises. Cheney (9) has said, "Nature must be kept on the right track and thus the need for palliative and preventive treatment arises." Nature does seem to plan systemically for the future in the development of the dental arch and the alignment of the teeth. The dentist, therefore, must keep in mind those plans of nature, and interfere when adverse internal or external factors begin to produce mal-occlusion.

As with a number of conditions, the old saying, "an ounce of prevention is worth a pound of cure", holds true for space maintenance. Dentists should not disregard the premature loss of a primary tooth with "it's just a baby tooth" attitude. At least they should advise the parents of the probabilities that are associated with premature losses or congenitally missing teeth.

Time and space permit only a discussion of premature losses in the primary posterior region. Premature loss of teeth

in the anterior portion of the arches presents separate problems due to growth factors.

The plans of Nature to secure adequate space for the eruption of the permanent teeth must be studied first. One must know what is to be expected, what is the pattern, and what is the deviation.

It will be recalled that the purpose of the primary teeth is to provide for mastication and the maintenance of the line of occlusion as well as providing spaces for the successor bicuspid teeth. It cannot be presumed, though, that a full complement of primary teeth is necessary for maxillary and mandibular bone growth. Adequately developed jaws and facial harmony have been seen frequently in children who have many congenitally missing teeth.

Space is not provided for the permanent first molar by interstitial bone growth. As concluded by Hunter (17) from his experiments, and confirmed by Brash (5), Schour (25), and others, the mandible does not grow in size by interstitial growth, but increases in length by additions to the posterior margin of the ramus and resorption at its anterior margin. Growth in width is obtained by lateral apposition to the outer plate, and resorption on the inner plate of basal bone. However, there is some evidence according to Friel (15), that room for the mandibular molar teeth is obtained in another manner. He stated, "whether there is absorption of the anterior edge of the ramus to make room for the molar teeth, and to what extent, or whether the upward and forward growth of the alveolar process, bringing all of the teeth forward, is sufficient to make room for these teeth, or whether it is a combination of these two processes, cannot at the present be determined."

Friel also presented evidence to show the forward movement of teeth, and pointed out the varying behaviours of the posterior teeth migrations following a break in the continuity of the arches. As an example, he showed how the second bicuspid can be left behind in the forward growth if the second primary molar is lost prematurely. Friel also noted that there is a difference in the amount of forward movement of teeth anterior and posterior to a break in the continuity of the dental between children of deficient growth and those of more growth. He explains that in the more vigorously growing child, the anterior segment tends to keep growing forward; but in the child of deficient growth, the anterior segment lags behind and the spaces are rapidly closed from the posterior direction.

Further evidence of the forward movement of the dentures is offered by Saltzmann (23), who writes of an "anterior resultant force." This movement is the result of a forward force (anterior component force) on the first permanent molars when they are in occlusal relationship and a distal lingual force upon the anterior incisors. Saltzmann concludes, "the anterior resultant force aids in the forward and lateral growth of the dentures and helps maintain the proximal contacts of the teeth."

Thus it can be seen that the loss of primary teeth breaks the effect of the "anterior resultant force" upon the teeth anterior to the space, and the forward movement of the dentures decreases while the posterior teeth are being carried anteriorly through the space. The result frequently becomes a total or partial blocking of the permanent successors in their line of eruption. Other occlusion factors are disturbed also when tipping of the permanent molars occurs.

In the practice of preventive orthodontics, one is concerned with the spaces that tend to close. How much can a space, pro-

vided by the premature extraction of primary molars, close and still be within safe limits to permit the unhampered eruption of a permanent bicuspid? G. V. Black's (3) measurements of individual teeth show that the average combined widths of the primary molars and cuspids exceeds the average combined widths of the permanent cuspid and bicuspid teeth, in any one quadrant of the mouth. From Black's tables, it can be determined that this difference in one quadrant of the mandible measures 1.7 mm, and in the maxilla 0.9 mm. This disparity in average combined diameters permits the permanent first molars to drift forward and eventually establish themselves in a normal occlusion; that is, the triangular ridge of the mesiobuccal cusp of the maxillary first molar occluding in the buccal groove of the mandibular first molar. Any anterior movement of the permanent first molars in excess of the above figures should be prevented if a normal occlusion is to be established. According to Moore (20), a space maintainer is indicated if any primary space closes up to one-quarter of its original width.

One may suppose if a space created by the premature loss of a primary molar has partially closed, the natural growth of the jaws during the mixed dentition stage will, to some extent, open up the space to safer limits. Studies by Lewis and Lehman (18), Stanton and Goldstein (28), Cohen (10), and Barrow and White (2), have indicated that only a limited amount of growth can be counted on which is directly concerned with the primary molar areas. Ample growth seems to take place in the anterior segment of the dental arch at the time of the eruption of the permanent incisor and cuspid teeth to allow adequate space in the intercuspid region. However, Lewis and Lehman, and Cohen, conclude that in the mandible some lateral growth occurs between the ages of 6 to 10 years in the primary first molar region; a consistent and definite growth period appears in the cuspid region between the ages of $5\frac{1}{2}$ and $8\frac{1}{2}$ years, or during the period in which the mandibular permanent teeth are erupting. After the age of nine, Cohen found no appreciable lateral growth in the mandibular cuspid area, but some slow steady growth between maxillary cuspids continuing until the age of 12. Stanton and Goldstein showed that there is only a very slight increase in arch width measured at the first permanent molar region from seven to eleven years of age. Barrow and White even found an average decrease in the permanent intermolar width after eleven years of age due to the natural shifting of the first permanent molar anteriorly. These studies indicate that in the region of the primary second molar, growth cannot be expected to accommodate a permanent second bicuspid that may be slightly impacted because of a mesial drifting of the first permanent molar. Bearing out this observation, Brauer (6) concluded from a study of premature extractions, that the possibility of space closure is much greater in the second bicuspid area than in the first.

Incidence of Space Loss

The dental literature does not abound with accurate reports accompanied by statistically significant figures on the incidence of malocclusion and tooth displacement due to the premature loss of primary posterior teeth. The data which have been reported vary in a wide range, perhaps due to the number of patients observed and the length of the period of observation. Brandhorst (7) stated that in a group of 100,000 school children, premature loss of primary teeth caused 20 per cent of all the dentofacial and oral deformities observed. Cohen (11), in a

study of 18 patients who had premature loss of a primary first molar, found only one instance where the first bicuspid failed to erupt properly. Loss of the second primary molar, however, was more serious since six second bicuspids in 15 instances of premature extraction failed to erupt in good position. Brauer (6) conducted a survey of 41 children over an average of 24.6 months (range 4 to 64 months). His results, too, showed, with the loss of a second primary molar, that a high percentage of space closure and a resulting malocclusion developed. 59 per cent of the premature extraction of 71 second primary molars had closed spaces with a definite malocclusion unless the areas reopened. Brauer thought that if a closed space subsequently reopens, such a widening may possibly be at the expense of the teeth in the anterior positions.

Lowery and Ross (19), in a serial study of 25 orthodontic models, found that 35 per cent of all cases showed some harmful effects due to the premature loss of primary teeth. They demonstrated, however, that growth would aid to some extent in the reopening of closed spaces. An opening of the original spaces occurred in 12.5 per cent of the mandibular spaces, and in 20 per cent of the maxillary spaces.

Weber (29) studied a group of 51 children who had one or more primary molars extracted prematurely over an average length of observation of six and one-half months. His data showed that 87 per cent of all spaces closed; 6.3 per cent opened, and 6.7 per cent remained the same. Weber postulated that premature loss of a maxillary primary molar is more likely to cause a malocclusion than the premature loss of a mandibular primary molar. He bases his thesis on the theory of less "leeway" for the maxillary permanent first molar to drift anteriorly than is permissible in the mandibular arch according to the average measurements of teeth as computed by Black.

Effects Resulting from Premature Loss of Primary Molar Teeth

It would be well to recognize some of the possible deleterious effects from the untreated premature extraction of primary molars in order to appreciate fully the subject of space maintenance. The dentist is expected to be familiar with the irregularities of dentition, and it is incumbent upon him to advise parents about the loss of space, and to explain the methods available to prevent further loss with its resultant malocclusion.

The premature loss of a primary tooth is the elimination of that tooth from the dental arch before its permanent successor is sufficiently advanced in its development and process of eruption so as to occupy the vacated space. The adjacent teeth may shift then in such a manner as to eliminate the space left vacant and initiate other occlusal disturbances.

Saltzmann (24) writes that the premature loss of primary teeth may result in a lack of development of the alveolar process about the space left by the extracted teeth. He observed that the premature loss of the primary cuspids is frequently followed by interference with the eruption of their successors in relation to the permanent incisors. Closure of the space may result from the mesial movement of the posterior teeth or by the lateral drifting of the anterior incisors. The spacing between the central incisors at the time of their eruption may remain, and thus the permanent laterals may be forced into a rotated position. Brauer (6) says that the early loss of the primary cuspid prior to the eruption of the permanent lateral frequently permits the lateral to erupt into the space intended for the permanent cuspid. Dewey and Anderson (13)

caution against the extraction of a primary cuspid to make room for an erupting permanent lateral in order to prevent malpositioned permanent cuspids.

Spencer (27) has pointed out another way in which the permanent cuspids may become malaligned. If there is drifting of the first permanent molar and the bicuspids erupt before the permanent cuspids, thereby occupying all of the space between lateral incisor and the first permanent molar, the cuspid becomes either impacted or erupts labially. If this cuspid were to be extracted for esthetic reasons, the undesirable condition only becomes aggravated. The arch, Spencer writes, is already constricted, probably because the first bicuspid has been forced lingually as a result of the partial eruption of the cuspid.

Premature loss of the first primary molar seems to be followed rarely by impactions of the first bicuspids. Perhaps this can be attributed to the growth factors in this region as well as the comparatively early eruption of the successor bicuspid. The second primary molar does not tend to drift to the mesial quite as readily as the primary cuspid tends to drift to the distal. When this does occur, there is a possibility of the lip falling under the lingual surfaces of the maxillary incisors and initiating protrusion of these teeth.

With the premature loss of the primary second molar, the first problem that might be encountered is quite obvious, i.e. the mesial drifting of the approximating permanent molar which may result later in a crowded second bicuspid. The mesial tipping or shifting of the permanent first molar invariably is found when normal cuspal relationships between the maxillary and mandibular bicuspids and molars are not definitely established, particularly between the ages of six to twelve. However, when occlusion or cuspal interlocking between the upper and lower permanent first molars is established, drifting may not occur in the event of the premature loss of the primary second molar.

In cases of premature loss of primary molars, many occlusion abnormalities may present themselves. Such is the case when all of the primary molars are lost and the patient thrusts the mandible forward in an attempt to obtain occlusion between the mandibular and maxillary cuspids, and an acquired mesiocclusion is produced. Multiple loss on one side of the dental arch is conducive to the production of an acquired crossbite as the patient attempts to find the most efficient occlusal relationship. Again, when most of the primary molar teeth are lost early, there seems to be a slight tendency for an increased overbite of the permanent maxillary anteriors, although Barrow and White (2) found that while the depth of bite decreases slightly from 3 to 6 years of age in normal cases, it gradually increases up to eleven years and thence remains unchanged to 17 years of age. Saltzmann, however, is of the opinion that multiple loss of the maxillary primary molars produces edge-to-edge bites because of the distal and lingual inclinations of the maxillary permanent lateral incisors.

Groth (16) observed that Angle Class II, Division 2, unilateral cases (Class II occlusion in which the maxillary incisor teeth are in linguo-version) are frequently the result of premature loss of one or more maxillary primary molars, resulting in the forward shifting of the molars and bicuspids and pushing out of the cuspids.

The premature loss of the primary molars may or may not result in the loss of space, and loss of space does not always lead to a malocclusion. Malocclusions that do develop from the premature loss of

primary teeth may disappear when all of the permanent teeth have erupted and are established in occlusal relationship. Repeated examinations at periodic intervals are necessary to determine if there are corrective tendencies of growth or the introduction of an abnormal occlusion.

Determination of Instances for the Use of Space Maintainers

Children presumably have been growing up and losing teeth since early times, and many, no doubt, still have achieved a good alignment or occlusion of their permanent teeth. Dentists have not been available always to guide and aid Nature, and it must be recognized that a space maintainer is not a necessity in every case of premature loss of primary molars. The decision to utilize a space maintainer should depend on an accurate diagnosis, which demands an observation of the resting occlusion, its cuspal relationships, and the study of complete radiographs of the mouth. A diagnosis of the type of occlusion in Angle's Class I, II and III is necessary also to determine whether or not to place a space maintainer.

The constitutionally small jaw with large teeth presents an unique problem in space maintenance. No doubt malocclusion will exist when there is a discrepancy between tooth size and tooth-bearing bone and premature loss of the primary cuspids or molars will accentuate this malocclusion. Observation of the parents' dentition is helpful in the diagnosis. Likewise, children with plenty of space in their jaws and a very adequate development of basal bone may not need space maintainers. Observation of the case is indicated. When a tendency to a Class III malocclusion is observed, spaces actually tend to become wider in the mandible, but in the maxilla with its loss of equal growth, the use of a space maintainer may be a wise decision.

If a Class II tendency is presented, with a deficiency of growth in the mandible, a space maintainer for premature loss in that arch can be advised definitely. In the maxilla, on the other hand, it may not be indicated. However, drifting of the teeth mesially in the maxilla may magnify the distal relationship of the mandibular teeth. Groth stated that more damage is done by the premature loss in an arch that is under-developed, as in the case of a Class II, Division 1, and in the maxillary arch of the Class III, and in the Class I cases where some of the maxillary teeth are in a lingual position.

It has been asked whether a general practitioner of dentistry can reach a conclusion during these early stages of developing malocclusions. With just an observation of the child, his occlusion, his facial appearance (one must rule out the thumb-sucking overjet), and the occlusion of the parents, it does seem that certain tendencies can be readily noted.

According to Spencer (27), it will be advisable generally to place a maintainer to hold the space of a second primary molar when the unerupted bicuspid has not yet progressed to a point equal to the level of the bifurcation of the roots of the first permanent molar. He concludes, too, that there is less harm through the premature loss of the first primary molars.

Cheyne and Wessels (12) state that in older children spaces do not close as rapidly as they do in younger children. They think that if a permanent molar is in an erupted position and locked into occlusion, and the difference between the child's dental age and expected eruption of a second bicuspid is not greater than 6 to 9 months, a space maintainer would not be indicated. They, at least, confirm the earlier statement that good cuspal inter-digitation is an aid in preventing the drifting of teeth.

Speidel (26) recently wrote that there

are still some incomplete explanations of why a first permanent molar does not tip mesially even though adjacent primary molars may be lost early; or why a permanent molar tips very rapidly though there is only a short time between exfoliation of the second primary molar and the eruption of the second bicuspid in its place. After a study of pertinent examples, he offers the following hypothesis: "If the second molar is erupting actively during a period when the mesial contact support of the first molar is reduced, the first molar is likely to tip mesially. Or, stated conversely, if the second molar remains unerupted until after the cuspid and bicuspid erupt, there is less likelihood of the first molars tipping and blocking out the bicuspids or cuspids." However, it must be remembered that a slight mesial movement of the mandibular permanent first molar is desired, preferably after the eruption of the second bicuspid, in order to allow the proper interdigitation of the upper and lower first molars.

Calloway (8) stated that the only contra-indication for the use of a space maintainer, when there is a break in the continuity of the dental arch, is death. However, he was of the opinion that if permanent tooth follicles were missing, it may be better to close the space by orthodontic treatment.

There are several instances in which special diagnosis is required to assure proper treatment for a primary second molar space. The premature loss of the second molar before the eruption of the permanent first molar is one of these instances. There appears to be sufficient evidence that the first permanent molar may move even anteriorly and tip mesially within the alveolar bone before its eruption should an approximating space be offered. A space maintainer with a distal alveolar extension to contact the mesial surface of the unerupted permanent molar can be constructed to prevent such a migration. Preferably, it should be placed at the time of the extraction of the primary second molar in order to gain a ready access to the mesial surface of the unerupted permanent molar.

The "submerged molar" presents another unusual problem in space diagnosis. Most of the men who treat this problem agree that the treatment of choice is to remove the offending tooth. Experience has shown that along with the "submerging" process, the permanent first molar begins to tip mesially. Removal of the pathologic tooth seems to accentuate the mesial drifting. Space maintenance, therefore, may be advisable in this particular situation.

Space maintainers may or may not be indicated in those arches which present with an existing malocclusion. If orthodontic treatment is planned for the future, or it becomes doubtful if such treatment will ever need to become initiated, the closing of a premature space may complicate the existing malocclusion. On the other hand, the closed space may make no difference in any future treatment, whether it be mechanical or physiological. Consultations with the orthodontist throughout the mixed dentition and young adult stages is indicated in these cases that may become complicated with the premature loss of primary teeth.

Methods and Aids in Diagnosis

The first aid in the diagnosis of treatment for a space problem is an appreciation of the chronology of the primary dentition. Combined with the use of radiographs, casts, and a ruler, accurate observation is the initial approach to treatment. There are wide limits, as every dentist knows, to the periods for the eruption of permanent teeth. The premature extraction which is due to infection may

destroy the periapical bone and hasten the date of eruption of the succeeding permanent tooth. The radiograph can be used to judge the amount of alveolar bone remaining over the unerupted teeth. If a period of nine or more months is expected to lapse before the eruption, the construction of a space maintainer probably should be considered. If the occlusion of the patient is deemed to be normal and functional for the patient, then observation is indicated dating from the time of loss of the primary tooth. Measurement of the space is recorded at the date of the extraction, again at one month later, and then at intervals of three to four months. If the space remains constant, or closes only to the limits of the average individual width measurements of the permanent cuspids and bicuspids, a space maintainer is not indicated.

Various "rules of thumb" have been proposed by some observers in the field of preventive orthodontics to aid the practitioner in his diagnosis of the need for a space maintainer. Most of these techniques are based on normal growth factors combined with a prediction of the amount of space that will be required by unerupted permanent teeth. Pont's Index (1909) (22) was one of the earlier theories. He measured the four maxillary incisors and computed just how wide the dental arch should be to allow perfect alignment of the permanent teeth. The use of this index would show approximately how much too wide or too narrow the dental arches are, and would indicate whether the predicted face size could possibly contain an arch of the size computed as necessary to align the teeth. Bogue (4) propounded the theory that if the palatal arch between the linguocervical margins of the second primary molars measures less than 28 mm., expansion of the arch would eventually be necessary. However, this theory was later refuted by many studies showing malocclusion in wide arches, or collapsed arch expanded cases.

More recently, Nance (21) presented a technique for space analysis which utilizes radiographs, casts, and a pair of dividers. He compares the amount of space available between the mesial of the mandibular first permanent molar, and the distal of the mandibular permanent lateral incisor with the total mesio-distal width of the permanent teeth that will occup the space. Nance utilizes the "leeway" in the fundamental fact, that the sum of the mesio-distal widths of the mandibular primary cuspids and molars of each side, exceeds, by varying amounts in different individuals, the sum of the mesio-distal widths of the succeeding permanent teeth. It is this "leeway" that may be used to determine the possibility of the unerupted teeth falling easily into the line of occlusion or becoming crowded. In the average case, Nance claims the "leeway" amounts to 1.7 mm. on each side, or 3.4 mm. available when all of the primary teeth are lost.

The difficulty in this technique lies in the use of the radiographic process to accurately measure the width of the unerupted teeth, and even when the distortion is reduced to a minimum, the teeth may be rotated in their crypts.

Ballard and Wylie (1) devised another method whereby one could estimate the widths of the unerupted permanent teeth that succeed the primary posterior dentition, calculated from a measurement of the total mesio-distal width of the four erupted mandibular incisors. From a mathematical prediction formula, they made a predictive graph for the estimated

measurement of the combined width of the cuspid, permanent first and second bicuspid. The mesio-distal width of the mandibular incisors is compared to the graph, and the sum of the three unerupted teeth thus is determined. Their average error was found to be only 2.6%, or 0.6 mm. The average error arising from the use of intra-oral dental film of average quality taken of the mixed dentition, was figured as 10.5%, or 2.2 mm.

All of these "rules of thumb" involve predictions of growth in the child, and in the human being it is hard to judge. Of course, these various aids help, but careful observation is still good treatment. Easlick (14) has criticized measurement standards by saying that they tend to become mechanistic, and the operator himself disregards individual patient variation.

Summary

The scope of this paper concerns itself with the problems brought about by the premature loss of primary teeth. First, the plans of Nature to secure adequate space for the eruption of the permanent teeth have been pointed out, and the importance of a normal complement of primary teeth to growth, also has been shown. Various studies have been cited to demonstrate just how much growth takes place in the dental arches, and how much this growth can be depended on to keep premature spaces from closing. The purpose of the study of growth and development has been to give the practitioner of dentistry for children, a scientific background to what can be expected of normal growth when the premature extraction of a primary tooth presents itself.

Various examples of the harmful effects of the premature loss of primary teeth are discussed. Perhaps many of these effects have been often noted by the practitioner, who has failed to appreciate their etiology. Knowledge of the possible harmful results that premature spaces create, will give one an appreciation of the subject of space maintainers. Many instances have been pointed out when the use of a space maintainer should be considered. Not all premature spaces need be held open with mechanical devices.

Several techniques in diagnosis are presented, but the stress has been placed on a careful scientific observation of the premature space, backed by the knowledge of the potentialities of normal growth. However, the individual patient and individual variations must be taken into account.

Conclusions

1. A study of growth and the occlusion in the normal child is necessary to understand the problem of space maintenance.

2. The normal occlusal forces tend to move teeth to the mesial.

3. In the event of the premature loss of a primary molar, a small amount of mesial drifting is tolerable before any crowding of the permanent successors takes place.

4. The primary second molar space shows a higher percentage of closure with a resulting crowded bicuspid than does the primary first molar space.

5. There is less likelihood of a closed primary second molar space opening than the primary first molar or cuspid space.

6. Malocclusion of the maxillary and mandibular permanent teeth may occur when there has been multiple premature loss of primary teeth.

7. The problem of space maintenance is one of diagnosis. The individual case

must be studied, keeping in mind the potentialities of a growth that is dynamic.

8. Diagnostic aids tend to become mechanistic and disregard individual variation.

9. It is the duty of every dentist who practices dentistry for children to inform the parents of the probabilities that are associated with the premature loss of primary teeth or the congenitally missing teeth.

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For the Record—

Editor's note:

Some months ago we published an article which discussed and implied a favorable reaction to the type of dentistry for children practiced in New Zealand. Dr. Gruebbel, a member of the A.S.D.C. observed the plan in operation in New Zealand, and we herewith print a release from the A.D.A. on his reactions.

A.E.S.

THE dental nurse plan in New Zealand, operated by the government since 1921, has had a deplorable effect on the practice and development of children's dentistry in that nation, Dr. Allen O. Gruebbel, of Chicago, declared in a report released recently by the American Dental Association.

Dr. Gruebbel, secretary of the Association's Council on Dental Health, spent two months in New Zealand earlier this year surveying the system under which 85 per cent of New Zealand's 320,000 children, from 3 to 13, receive nearly all dental care from government-salaried dental nurses. The nurses, after limited training, fill, extract and clean teeth of children.

Dr. Gruebbel was sent to New Zealand by the American Dental Association to evaluate the dental nurse plan after proposals were advanced for the establishment of a similar plan in the United States.

Dr. Gruebbel said he found that the prevalence of dental disease, particularly dental decay, is as high or higher in New Zealand at present than in any other country for which data have been reported and is "at least twice as high as in most areas in the United States."

The dental nurse system, as operated in New Zealand, he reported, has had "a deleterious effect on the scientific development of pedodontics (dentistry for children)."

"Dentistry for children, which many authorities believe to be the most important part of dental practice," he said, "is almost completely neglected by the dental profession in New Zealand, and until three years ago was not taught in the dental school."

This, he explained, resulted from the fact that under the scheme, dental care for children has been "relegated almost entirely to partly trained auxiliary personnel."

Dr. Gruebbel was sharply critical of the two-year training course provided dental nurses by the New Zealand government.

"Although the dental nurse is expected to provide a scientific health service, a considerable portion of which is of a surgical nature, she is given no scientific training, she is not encouraged to read scientific books or publications and she is not given an opportunity for continuing her dental education," he said.

The A.D.A. representative said he had found that scientific aspects of dental services were "deliberately excluded from the course of instruction in order that dental nurses will not develop a professional attitude."

Also contributing in large measure to the poor type of dental health service being provided children is the almost complete lack of technical supervision of

the work of the dental nurse, Dr. Gruebbel said, pointing out that he found that dental officers often did not inspect the work of the nurses more frequently than once in six months.

He said that a child was supposed to be referred to a dentist if the dental nurse believed he required treatment beyond her scope, but added that "this practice is more often the exception than the rule." He continued:

"Young children need such expert services as surgical treatment of the pulp, preventive and corrective orthodontic care and preventive and corrective treatment for abnormal growth and development—services which few children in New Zealand now receive."

Inadequate and outdated equipment was also noted by Dr. Gruebbel. He said that satisfactory examinations and diagnoses were made impossible by the almost complete lack of x-ray equipment. He also found the use of questionable types of filling materials and equipment "symbolic of an era which modern dentistry has relegated to the past."

Dr. Gruebbel said that the government sponsorship of the scheme had given New Zealand parents a false sense of security regarding the dental health of their children, adding:

"The public cannot be expected to know dentistry's role in a complete health service so long as dental treatment for children is limited largely to filling, extracting and cleaning teeth."

Dr. Gruebbel also deplored the lack of research and measures designed to prevent dental disease.

"The approach has been to develop a large scale reparative service. No attempt of any consequence was made to reduce the size of the problem through research and prevention. The high incidence of dental disease and the high cost of the reparative service will remain unchanged until more emphasis is placed on research and prevention," he said.

Pointing out that the dental nurse plan has served as the basis for the development of a large scale system of state dentistry in New Zealand, Dr. Gruebbel reported that a large number of dentists believe "that dental care controlled by the state eventually will lead to a serious deterioration of the quality of dental care as is now taking place in the field of medicine in New Zealand."

Hemostasis: Applications in Dentistry

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Editor's note:

The following well written and informative paper on Hemostasis was presented by Doctor Mercer before the Cleveland group of our Ohio Unit. Doctor Mercer is a member of the Department of Pediatrics, W.R.U. School of Medicine, and is on the staff of the Babies and Children's Hospital of Cleveland. This is indicative of the type of material the progressive Cleveland group is presenting to its members.

A.E.S.

THE problem of hemorrhage and the control of hemorrhage from wounds is of unique importance in dentistry. The dentist is in a particularly vulnerable position concerning the production of serious hemorrhage in patients with one of the hemorrhagic diseases; it is very common for a patient to be totally ununaware of his hemorrhagic diathesis until bleeding continues for days or weeks following an extraction.

Newer methods of controlling hemorrhage, based on more accurate information concerning the physiology of hemostasis and coagulation are now available. The purpose of this paper is to present a brief review of these methods with their physiological background as well as a description of those hemorrhagic diseases most important in dentistry.

NORMAL HEMOSTASIS

Two fundamental things occur in nature to stop the loss of blood following an injury. The first is immediate contraction of the vessels injured and the second is the coagulation of the shed blood. The contraction of normal capillaries is quite striking in efficiency and the contracted capillary is able to withstand considerable pressure from its underlying arteriole. The contraction of capillaries explains why small lacerations and stab wounds frequently stop bleeding in much less time than the normal coagulation time of the blood. Vascular contraction is also effective in large wounds and seems to be directly correlated with the degree of trauma. It is not uncommon in civilian or wartime practice to see crushing injuries which have resulted in traumatic amputations in which vascular contraction has prevented the loss of blood even from major arteries.

Capillary contraction in small wounds is usually effective for from twenty minutes to an hour or more during which time the shed blood coagulates and acts as a firm plug in the wound. In some of the hemorrhagic diseases there is a failure of capillary contraction. In such a circumstance bleeding is prolonged since clot formation is not effective at the bleeding surface. It takes several minutes for a clot to form and if the beginning clot is continually washed away from the bleeding surface it can not be effective in hemostasis. It is this fact that explains the apparent paradox in some of the bleeding diseases where an increased bleeding time is associated with a normal clotting time. Simple pressure is effective

in controlling hemorrhage since it prevents active bleeding long enough for a normal clot to form.

Under ordinary circumstances the contracted capillary re-opens after a firm clot has formed and no further hemorrhage occurs. The re-opening of the capillary may be the first stage of repair of the wound. If there is a clotting defect and no clot is formed, hemorrhage will occur when the capillary re-opens. This situation is seen in hemophiliacs and it is not uncommon for such a patient to bleed very little at the time of an tooth extraction only to start bleeding an hour or two later and to continue to bleed for days or weeks.

Following the formation of a normal clot, retraction or contraction of the clot occurs resulting in a tougher fibrin mass and possibly pulling the cut surfaces of vessels or tissues into closer approximation. In some circumstances, particularly when the numbers of blood platelets are reduced in the circulating blood, retraction fails to occur and the resultant clot is weaker than normal.

Normal Coagulation

The problem of coagulation has intrigued investigators for over a century and a tremendous volume of largely controversial literature has developed. Probably the only undisputed fact is the observation that blood does clot. It is sufficient for our purposes to discuss only those factors which are generally accepted.

The essential change in the clotting of blood is the transformation of fluid fibrinogen into solid or semi-solid fibrin. This change is brought about by the enzymatic action of thrombin which in turn is formed from a precursor prothrombin through the action of thromboplastin in the presence of ionized calcium. (Figure 1).

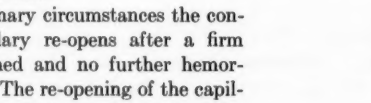

Fig. 1

Fibrinogen is a plasma protein of high molecular weight which exists in the blood in large quantities. Defects in blood clotting due to a lack of available fibrinogen are seen only very rarely and are of little practical importance. If such a defect does exist and it is necessary to operate on such a patient, the clotting mechanism can temporarily be rendered normal by a transfusion of fibrinogen or concentrated plasma. Curiously enough individuals with a congenital absence of fibrinogen may get along fairly well as nature calls other mechanisms into play in the control of hemorrhage.

The amount of fibrinogen in the plasma of normal individuals is fairly constant but in the presence of infection the amount may be greatly increased. Fibrinogen is probably produced by the liver and disease of the liver such as acute hepatitis may be accompanied by a decrease in plasma fibrinogen.

When the formation of fibrin from fibrinogen is observed under the microscope the fibrin is seen to be composed of a three-dimensional network of needle-like fibrins. These become matted together and eventually indistinguishable as the clot contracts. The usual clot is a deep red due to the red blood cells enmeshed in the fibrils. However, the red cells can be washed free of the clot and the resultant fibrin mass is a grayish-white

opaque substance. The fibrin clot has considerable tensile strength which increases as the clot contracts. This tensile strength is important in maintaining hemostasis. The fibrin clot probably also serves as a barrier against infection. Fibrin is found in all inflammatory exudates and it is probably fundamental in wound healing. The inadequate production of fibrin may be a factor in the delayed wound healing observed in some hemophiliacs.

Thrombin is the factor which is capable of transforming fibrinogen to fibrin. Thrombin does not exist as such in fluid blood but is formed from an inactive precursor prothrombin. Thrombin is an albumin-like protein and very powerful preparations are available commercially. In a concentration of about 1000 units per cc. thrombin will clot blood almost instantaneously. Its action is probably enzymatic for thrombin can clot hundreds of times its own weight of fibrinogen.

Prothrombin, the inactive precursor of thrombin, is present as such in the circulating blood. It is probably a globulin and thought to be manufactured in the liver. There is not very much prothrombin present in human plasma but as noted above it has great activity when fully converted to thrombin. Vitamin K is essential for the formation of prothrombin.

Prothrombin is converted into thrombin through the action of thromboplastin in the presence of ionized calcium. The exact nature of this reaction is unknown. Thromboplastin is present in most tissues but brain and lung yield the most active preparations. Thromboplastin is available commercially for hemostatic purposes but since its action depends on the conversion of the patient's prothrombin into thrombin and the subsequent conversion of fibrinogen into fibrin its action is slower than the use of purified thrombin. A defect in the thromboplastic conversion of prothrombin to thrombin probably exists in the diseases hemophilia and pseudohemophilia.

A number of other less well understood factors are of importance in the blood clotting mechanism. There are also factors present in the blood to inhibit the formation of a clot and to destroy the clot after it has formed.

Hemostatic Agents

A number of agents are available commercially to aid in hemostasis. In application of the above basic principles, most bleeding wounds can be adequately controlled even in the presence of a major hemorrhagic disease.

Simple pressure is one of the most effective means of controlling hemorrhage and one of the most neglected. As explained previously, the patient may have completely normal blood as far as coagulation is concerned, but clotting takes time and an effective clot cannot form on a freely bleeding surface. If sufficient pressure is applied to prevent free bleeding and held long enough for normal coagulation to take place, bleeding may be completely controlled. Direct manual pressure over a pack is probably the most effective method. It is difficult to place or tie in a pack in such a way that it will exert adequate pressure by itself. Bleeding from relatively large vessels and arterioles may be controlled by pressure as well as bleeding in those diseases in which there is a capillary defect such as the purpuras.

Potent thrombin preparations are now on the market and are perhaps the most valuable of all hemostatic agents. When strong thrombin solutions are used blood will clot almost instantaneously. Proper application of thrombin is, however, essential for good results.

To obtain maximal effectiveness the

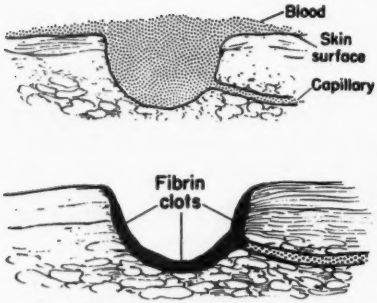

FIG. 2. From Walter H. Seegers and Elwood A. Sharp HEMOSTATIC AGENTS. Courtesy of Charles C. Thomas, Publisher, Springfield, Illinois, U.S.A.

clot must be formed at the mouth of the bleeding vessel. Clotting cannot be produced in the vessels in the depths of the tissues. However, a firm clot at the mouth of the bleeding vessels will be able to withstand capillary pressure. The bleeding tooth socket should first be wiped or suctioned free of flowing blood. At the instant the wound is clean, thrombin of a potency in the range of 1000 units per cc. should be applied. If the thrombin is used in a syringe the entire bleeding surface can be flooded at once. (Figure 2)

If a pool of blood is allowed to collect in the wound before thrombin is applied, the clot formed will only be over the surface of the fluid blood. The fibrin clot itself acts as a barrier to further penetration of thrombin. In such a situation the capillaries continue to bleed and the clot is lifted from the surface as a result of the hydraulic pump effect. If weak solutions of thrombin are applied, the clot formation is slower and the ultimate result is the same as if the thrombin were applied over a pool of blood. (Figure 3)

Weaker solutions of thrombin are effective if pressure is applied to prevent bleeding from the capillaries long enough for the clot to form. Such an effect can be produced if gauze or similar substance is soaked in thrombin and then applied with pressure.

Adrenalin has been used to control hemorrhage through vascular constriction. If there is a defect in coagulation, however, this method is inadequate since bleeding will occur at the time the capillaries re-open. Thromboplastin has also been used as a hemostatic agent. However, as mentioned before, its effectiveness depends on the activation of the patient's own prothrombin. The use of pressure and thrombin in the first place is much to be preferred.

Packs are desirable for the control of hemorrhage in larger wounds and deep cavities. Packs of various materials such as cotton, gauze or absorbable cellulose are about equally effective in hemostasis insofar as they provide an increased surface area which hastens clotting. Packs of absorbable materials, however, have an advantage in that they produce less

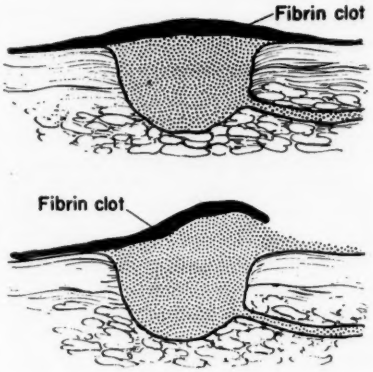

FIG. 3. From Walter H. Seegers and Elwood A. Sharp HEMOSTATIC AGENTS. Courtesy of Charles C. Thomas, Publisher, Springfield, Illinois, U.S.A.

tissue reaction. The disentegrating material can also be easily removed without the production of additional trauma to the healing wound or, if desired, the packs can be left in place.

Absorbable cellulose products are formed from cotton, gauze or thread by exposure of the cellulose products to the oxidizing fumes of nitrous oxide gas. Such products are on the market in several forms, some of which are especially designed for use in dentistry. These materials become sticky and swell when wet and are eventually reduced to a gelatinous mass. They exert some additional pressure by swelling and the sticky mass may aid in hemostasis by taking the place of a clot. Seegers (1) states that after extensive extractions or alveolar resection, closure with suture with the hemostatic cellulose in situ is the method of choice.

Fibrin foam and gelatin sponge are also easily available for use as hemostatic agents. These are essentially similar to the oxidized cellulose products. They are easy to work with and when wet can be readily molded into whatever shape is desired.

All types of absorbable packs are most effective if soaked in thrombin before use. Furthermore it is difficult to place any pack in such a way that it will exert adequate pressure by itself. It is highly desirable to hold the pack in place by hand long enough for an adequate clot to form.

The Hemorrhagic Diseases

The hemorrhagic diseases the dentist is most likely to meet in practice are those due to prothrombin deficiencies, hemophilia, the purpuras, and hemorrhagic states resulting from invasion or destruction of the bone marrow.

For many years it has been known that patients with jaundice may show an abnormal tendency to bleed. It has only been in comparatively recent years, however, that this has been shown to be the result of a prothrombin deficiency. Prothrombin is manufactured in the liver and vitamin K is essential in its formation. Vitamin K requires the presence of bile for its absorption and in the presence of obstructive jaundice there is a deficiency in the absorption of K with a subsequent diminution of available prothrombin. Such patients bleed both through a defect in capillary contraction and the formation of weak and friable clots. If surgery is necessary for a jaundiced patient, vitamin K should be administered parenterally preceding and following the operation.

Hemophilia is an hereditary disease characterized by a delayed coagulation time and resultant hemorrhages. The disease is seen only in males. It is transmitted by females as a sex-linked recessive mendelian factor. These patients frequently do not show bruises, petechiae or other readily noticed signs of a bleeding tendency and it is not uncommon for the first manifestation of the disease to be uncontrollable hemorrhage following a tooth extraction.

The capillaries are normal in hemophiliacs and following minor wounds bleeding may stop in the normal time due to capillary contraction. However, the second major factor in normal hemostasis, coagulation, is defective and at the time the capillaries re-open bleeding occurs. Pressure alone is of no practical value in the control of bleeding in hemophilia. The blood, however, can be caused to clot promptly with the addition of thrombin so that local therapy with a strong solution of thrombin plus pressure is effective. The blood in hemophiliacs can be rendered temporarily normal as far as

clotting time is concerned by a transfusion of fresh blood or plasma. If major surgery is necessary, the use of a fresh or direct blood transfusion is highly desirable just prior to operation.

Pseudo-hemophilia is a somewhat similar disease seen in both males and females. It is also hereditary and may be transmitted by either parent. This condition seems to depend largely on a capillary defect and the clotting time is usually normal or only slightly prolonged. Purpuric areas over the extremities are seen in pseudo-hemophilia and bleeding into the gums is common as well as petechiae over the buccal mucous membranes and the hard and soft palate. Adequate information is not available as to the response of these patients to the various methods of hemostasis. However, from a consideration of the probable abnormal physiology, we would judge that control of the capillary bleeding by pressure until a clot has formed would be effective. A few adroit questions concerning a family history of bleeding may save a great deal of difficulty when handling these patients with hereditary hemorrhagic disorders.

The purpuras are a group of diseases characterized by spontaneous hemorrhages into the skin, mucous membranes and other tissues. The onset of purpura may be insidious and it may progress sub-clinically until some traumatic episode brings it to light. It is not at all uncommon for purpura to be first diagnosed because of uncontrollable bleeding following extractions or other dental surgery. Most patients with purpura, however, will have a history of easy bruising and usually multiple ecchymotic areas may be seen over the extensor surfaces of the arms and the legs. Petechiae are often present in the mucous membranes of the hard and soft palate and spontaneous nasal hemorrhages and bleeding from the gums are particularly common.

The purpuras are usually classified by dividing them into those characterized by a diminution in the number of blood platelets and those in which the platelet count is normal. Each may be the result of any one of several causative factors. The platelet deficient purpuras are further classified into those in which the cause is unknown or idiopathic thrombocytopenic purpura (Werlhof's disease), and those in which the condition is symptomatic or secondary to some other disease process.

Idiopathic thrombocytopenic purpura occurs most frequently in children and young adults. The cause of the condition is unknown. It occurs more frequently in females than in males and is relatively uncommon among negroes. There is frequently a family history of ready bruising or frequent nose bleeds but a clearly defined hereditary trait cannot be demonstrated.

The characteristic finding in the blood in this disease is a marked reduction in the number of platelets. The bleeding time is prolonged but the clotting time in glass tubes is normal. Retraction of the clot is poor or absent. It is generally considered that the hemorrhagic symptoms of the disease are related to the reduced numbers of platelets. This question is not entirely settled, however, and in many instances a good correlation between the numbers of platelets and the amount of bleeding cannot be demonstrated. MacFarlane (2) has demonstrated a failure of capillary contraction in idiopathic thrombocytopenic purpura and this may be the essential defect. A given bleeding point may be controlled by simple pressure long enough for coagulation to take place. However since there is a failure of clot retraction the

clot formed is not as efficient as a normal clot in hemostasis.

The bone marrow in this disease frequently contains large numbers of megakaryocytes which are giant cells which normally produce blood platelets. It is the opinion of many investigators that the spleen inhibits the production of platelets from these megakaryocytes. Whatever the true situation may be it is well known that removal of the spleen frequently brings about a remission in the disease. The cessation of bleeding is usually, but not always, accompanied by a return of normal numbers of blood platelets.

Symptomatic or secondary thrombocytopenic purpura may be produced by exposure to any of several toxic drugs such as the organic arsenicals, gold salts or benzol. It also may accompany infections such as septicemia. It is not uncommon as a manifestation of disease in which the spleen is involved such as Banti's disease, Gaucher's disease, hemolytic anemia and rheumatoid arthritis.

The classical forms of non-thrombocytopenic purpura are sometimes referred to as "anaphylactoid" purpuras since they are usually associated with some of the common symptoms of allergy such as hives, swollen joints and transient skin rashes. The blood appears completely normal in non-thrombocytopenic purpura but a capillary defect has been demonstrated by MacFarlane (2). Pressure is also effective in controlling a given bleeding point in this disease. However the final solution depends on discovering and treating the cause of the allergy.

Hemorrhagic diseases associated with invasion or destruction of bone marrow are sometimes included among the thrombocytopenic purpuras. Although reduced platelets are usually seen with these conditions there is some question as to their importance in the production of bleeding. The most common condition that the dentist sees in this group is acute leukemia of childhood.

Acute leukemia is characterized by an overwhelming proliferation of young malignant white blood cells within the bone marrow so great that normal blood elements may be almost completely replaced. Bleeding from the gums is very commonly one of the first symptoms of the disease and it is frequently the dentist who is the first to suspect an abnormality of the blood. These patients usually also have purpuric areas over their extremities and petechiae in their oral mucous membranes. Enlargement of lymph nodes is also common and such enlargement is readily seen in the neck and sub-maxillary areas. The combination of enlarged cervical nodes, easy bruising and bleeding gums should make the dentist immediately suspicious that he is dealing with a serious blood disease.

Bleeding in acute leukemia is one of the most distressing symptoms of the disease. Bleeding may occur anywhere in the body and it is particularly difficult to control. Gum bleeding may constitute major hemorrhage particularly when the source of bleeding is between the two upper central incisors, an area which is well supplied with blood vessels. Major hemorrhage from the gastrointestinal and genito-urinary tracts is very frequent and intracranial hemorrhage may result in sudden death.

The blood in acute leukemia usually shows a decrease in the number of blood platelets although there is not always a close correlation between the degree of thrombocytopenia and the hemorrhagic manifestations. The bleeding times and clotting times are usually normal but clot retraction is poor. A capillary defect probably exists in this condition.

Measures taken to relieve hemorrhage

in acute leukemia have met with little success. However, all bleeding will cease if the patient can be brought into a remission with such agents as the folic acid antagonists. Unfortunately these agents can also contribute to the hemorrhagic nature of the disease by their toxic action on the bone marrow. Attempts have been made to relieve the hemorrhage manifestations of acute leukemia with the intravenous use of toluidene blue, protamine sulfate, and the amino acid lysine. These agents may be of some value but the problem of hemorrhage in acute leukemia is still far from solved. Direct transfusions of whole blood without the use of anticoagulants is probably the most useful method at present to produce hemostasis.

Invasion of the bone marrow by other malignant processes such as Hodgkin's disease or neuroblastoma may produce essentially the same picture as seen in acute leukemia. Bone marrow destruction by such physical agents as roentgen rays and radium is also associated with an abnormal bleeding tendency.

Bleeding following massive exposure to ionizing radiation such as happens with the use of the atomic bomb in warfare is a problem that is of major importance to us all. Bone marrow may regenerate after such an exposure but death frequently occurs from hemorrhage or infection before such regeneration can occur. There are very few available methods for combatting such hemorrhage other than those mentioned in the discussion of acute leukemia. Repeated direct transfusion is probably the most reliable procedure to use and this may be completely impractical when dealing with exposure of large numbers of people. The most imperative need for research in hemostasis today is to solve the problem of the treatment of hemorrhage resulting from exposure to ionizing radiation.

The prints for Figures 2 and 3 were supplied through the courtesy of Professor Walter H. Seegers.

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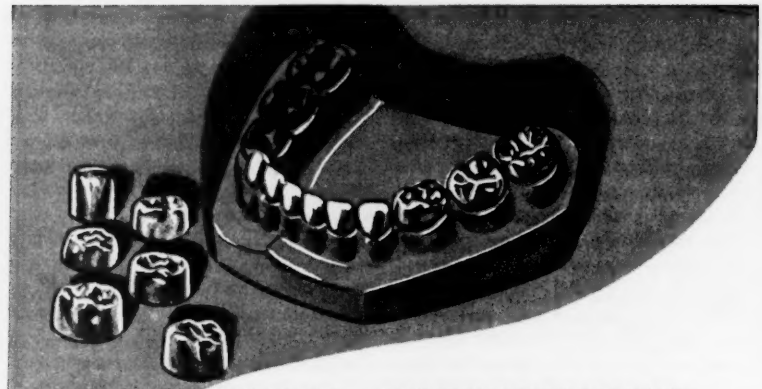

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Secretary's Message

This year "Adequate Dental Care for More Children" has become not only a slogan but a living reality to thousands of dentists. Attesting to this fact is the addition of over 1,500 to the membership roster of A.S.D.C., bringing the total to well over 4,000 as of June 1. The direct appeal nation-wide membership campaign of 1949 has produced gratifying results, but the impetus should be maintained.

The A.S.D.C. now has twenty-one units, with two more being organized, Colorado and Ontario. Many states now have more than the required twenty charter members and it is hoped that several more units will be admitted at our nineteenth annual meeting in Atlantic City.

The response to the mailing of statements was gratifying and your co-operation with your Unit Secretary and myself is greatly appreciated. Members delinquent as of June 1 have been dropped and their names removed from the mailing list of the Journal of Dentistry for Children.

Members of the A.S.D.C. have identified themselves with the fastest growing and most talked about branch of dentistry today. We invite the recent graduates to become one of us upon graduation. Again this year in many of the Colleges of Dentistry, a Certificate of Merit, which carries with it one year free membership in the A.S.D.C. and a subscription to the Journal, was awarded to the senior who exhibited interest and demonstrated outstanding ability in the subject of Pedodontics. A Second award has been made available. It provides one year free membership in the Society and an accompanying subscription to the Journal.

To expedite the growth of our society, I urge each member to try and interest one dentist to seek membership in A.S.D.C. Our Journal is now going to all parts of the world and with your added help Dentistry for Children will reach the goal it properly deserves.

I hope to meet many of you personally in Atlantic City during our National Meeting in October.

HUGH KEENAN

Unit News

News intended for this department should be sent to the undersigned before October 28, 1950 to meet the deadline for the next issue.

MEL NOONAN
141 S. Bates St.
Birmingham, Michigan

Tennessee

Dr. Al. H. Trithart informs your editor that the second annual meeting held at the Read House in Chattanooga on May 9th was a success. The 60 members present listened to Dr. Frank Bowyer of Knoxville at the luncheon and Dr. Willard T. Hunnicutt of Atlanta, Georgia during the afternoon session.

At the business meeting the constitution and by-laws were officially adopted and the following officers were elected:

F. A. Petrucelli, Nashville.....Pres.
Kimbrough Boren, Memphis...Vice Pres.
A. H. Trithart, Jackson.....Sec. Treas.

The Tennessee Unit presently has 89 members with an active local chapter in Memphis under the able leadership of Drs. Ralph Braden and Kimbrough Boren. Drs. F. A. Petrucelli and Roy O. Elams, Jr. are putting forth all of their efforts to start a local chapter in Nashville.

Colorado

Correspondent William P. Humphrey writes that he and the rest of the newly formed Colorado unit are looking forward to their first organized session which will be held in October in conjunction with the state dental meeting.

Arkansas

One-third of the table clinics given in Little Rock at the state meeting were arranged by members of the A.S.D.C. unit and all phases of pedodontics were covered.

After the ballots were counted on election day the following men were victorious:

M. S. Nickol, Osceola.....Pres.
Charles Craig, Blytheville.....Vice Pres.
R. L. Smith, Little Rock.....Sec. Treas.

Michigan

The annual election meeting of the Michigan unit was held in April and the officers for the coming year are:

Harold Maxmen.....Pres.
C. Roy Brooks.....Vice Pres.
Melvin A. Noonan.....Sec. Treas.

Dr. John Schlemer, a physician with a law degree, lectured on "The Child and the Law". His talk was enlightening. It is a subject which is not too well understood and overlooked by many practitioners.

Southern California

Dr. Spencer Roan Atkinson, teacher, lecturer, clinician and writer, spoke to the Southern California Unit at its last regular meeting, on "Growth and Development". A large crowd was on hand to hear this learned, genial gentlemen present a wealth of timely information on the subject he knows so well. It was a successful scientific evening, and another milestone in the progressive programs of this Unit.

Ohio

Dr. E. Carl Miller will lead the Cleveland group as President for 1950–51, and is planning a series of programs to keep

up the fine record established last year, when four outstanding meetings were held, with new attendance records being made at each. Good luck to you, Carl, and you Clevelanders!

Minnesota

Here is real news! The Minnesota dental examiners have changed the amalgam restoration for the state board from a permanent tooth to a primary molar. All hats should be tipped to Dr. Harold Wittich; he is responsible for this advancement. Examiners from all states should take notice and action in the same direction.

After the election meeting on May 19th the following men held the controls for the unit.

Robt. M. Elliott, Wayzata.....Pres.
Allen Petersen, Minneapolis..Pres. Elect
S. H. Miller, St. Paul.....Sec'y.
J. A. Kock, St. Paul.....Treas.

Our good friend Charles Sweet from San Francisco audited the post graduate course of the University of Minnesota. Reports are that his talk was "Mellow"—

Nebraska

Forty four of the 108 members of the Nebraska unit attended a meeting held by their society in Lincoln at the University of Nebraska. The program was a panel discussion on the subject, "The Economic Aspect of Practice Management as Applied to Dentistry for Children". The moderator was Earl Lampshire. Members of the panel were Thomas P. Mullins, Chadron; Gene Walters, Columbus; Herbert Jackson, Beatrice; F. W. Albrecht, Lincoln; Laren W. Teutsch, Omaha.

It was expressed unanimously that the meeting was very informative and that Nebraska has men within its own society who can put on a worthwhile meeting.

New York

From Joe Kauffmann, new Editor of our New York Unit comes the following report:

The annual meeting of the New York State Society of Dentistry for Children was held June 6, 1950, at the Hotel Statler, New York City. In its morning session the Executive Council pledged the fullest support to every constructive effort of the A.S.D.C. At the mid-day luncheon about thirty children of Public School 181, Brooklyn, N.Y., under the direction of Mrs. Fay Alexander, dental hygienist of the New York City Department of Health, gave a sparkling operetta in multi-colored costumes on "The Importance of Dental Health." The show was an overwhelming success. Then Dr. Benjamin J. Pressman gave a splendid exhibition entitled "How To Use Tricks of Magic To Interest Children in Mouth Health." Nothing like it has been seen before in New York!

In the afternoon the general membership adopted the new version of the Constitution and By-laws, modeled closely after that of the A.S.D.C. Retiring President Joseph J. Obst introduced the new officers for the coming year: President Harold D. Bowman, President-Elect Robert L. Montgomery, Vice-President Matthew Besdine, Secretary-Treasurer Harold E. Klein and Editor, Joseph H. Kauffmann. Harold Bowman spoke glowingly of the outstanding success achieved by retiring President Obst. Excellent table clinics were next given by the Misses Albanese and Rosenthal, dental hygienists, and by Doctors M. Joel Freedman, Joseph Gary, Henry W. Jann, Raymond Kielich and Leonard Kohn. There followed a fine dinner arranged by the retiring Secretary-Treasurer, Hugh A. T. Keenan. One of those on

the dais was New York's own Bill Taub, now A.S.D.C. President.

In the evening a scientific session was held in conjunction with the Dental Society of the State of New York, which was also in annual convention at the Hotel Statler. A packed assembly hall, standing room only, heard three accomplished speakers on preventive dentistry: Robert G. Kesel, David B. Ast and Arthur Bushel. The zealous interest displayed by an audience of over five hundred, none leaving before the last word had been spoken, augured well for the future of Dentistry for Children.

American Academy of Pedodontics

THE third annual meeting of the American Academy of Pedodontics was held in Lincoln, Nebraska at the College of Dentistry, University of Nebraska, on June 26, 27, 28, 1950. Dr. Ralph Ireland, president, arranged an excellent scientific program, including the following essayists: Charles Delio, D.D.S., M.S., Instructor of Pedodontics, Creighton University; Earl Lampshire, D.D.S., Instructor of Pedodontics, University of Nebraska; Walter Weiland, B.S., M.E., Professor of Mechanical Engineering, University of Nebraska; Ray Knapp, D.D.S., Associate Professor of Fixed Denture Prosthesis, University of Nebraska; Ralph Ireland, D.D.S., M.S., Professor of Pedodontics, University of Nebraska; Ernest Hancock, M.D., Pediatrician at the University of Nebraska; and Burdett Gainsforth, D.D.S., M.S., Orthodontist at the University of Nebraska.

Joseph Hartsook, D.D.S., M.S. Assistant Professor of Dentistry, University of Michigan, led a group discussion evaluating the scientific principles for the incipient class two cavity preparation in primary molars.

New officers for the American Academy of Pedodontics are: President, Walter McBride; Vice-President, Kenneth Easlick; Secretary, L. Smith Pettit; Treasurer, Harold Addelston.

AN EVALUATION OF CARBOHYDRATE RESTRICTION

(1) How effective is carbohydrate restriction?

Ans.—It has been demonstrated that a close correlation exists between the number of lactobacilli in the saliva and the degree of dental caries activity. It also has been found that the number of these oral organisms can be reduced sufficiently to arrest dental caries by the restriction of carbohydrate in the diet. Jay has stated that a diet restricted to 100 grams of carbohydrates with protein and calories adequate for the age and activity of the patient, for a limited period (2 weeks) has reduced successfully the aciduric bacteria in at least 78 per cent of the people who cooperate with dietary control.

Ref: Collins, R. O., Jensen, A. L., and Becks, Hermann. Study of caries-free individuals: II. Is an optimum diet or a reduced carbohydrate intake required to arrest dental caries? Am. Dent. A. J., 29:1169–78, July 1, 1942. Jay, Philip. Personal communication, May 2, 1945. Fosdick, L. S., and Burrill, D. Y. The effect of pure sugar solutions on the hydrogen ion concentration of carious lesions. Chicago Dent. Soc. Fortn. Rev., 6:7–10, Dec. 1, 1943.

(2) How practical is carbohydrate restriction?

Ans.—The use of a restricted carbohydrate diet as a mass procedure is impractical. The cost of the proper foods makes such a diet too expensive for a large group of people. The types of food needed are hard to obtain, particularly seasonal fresh fruits and vegetables. The majority of canned foods are not acceptable for the low-sugar diet because of their high sugar content. Only those cooperative patients with a lactobacillus count of 10,000 or more should be considered for treatment by dietary restriction, and then only with the full cooperation and supervision of a qualified person. Patients with conditions such as allergies, peptic ulcers, colitis and cholocystitis are not likely candidates for the dietary control of dental caries.

Ref: Jay, Philip. Nutrition and dental caries. N.J.S. Dent. Soc., 15:20–4, Jan. 1944. Koehne, Martha. Relation of diet to oral health. Am. Dent. A. J. and Dent. Cosmos, 25: 1767–80, Nov. 1938. Collins, R. O., Jensen, A. H. and Becks, Hermann. Study of caries-free individuals. II. Is an optimum diet or a reduced carbohydrate intake required to arrest dental caries? Am. Dent. A. J., 29:1169–78, July 1, 1942.

(3) Is elimination of sugar from the diet harmful?

Ans.—There is no real need of sugar at all, providing that the diet is kept balanced relative to the amount of carbohydrates and proteins. The Council (U.S.A. Council on Foods and Nutrition) concludes that it would be in the interest of the public health for all practical means to be taken to limit the consumption of sugar in any form in which it fails to be combined with significant proportions of other foods of high nutritive quality. If a diet is adequate in the quantity and quality of all nutrients, the healthy child will not have an abnormal craving for sweets, especially sugar.

Ref: Bell, Muriel. Is sugar necessary? Austral. J. Dent., 15:412–4, Sept. 1943. Jay, Philip. Nutrition and dental caries. N. J. S. Dent. Soc. J., 15:20–4, Jan. 1944. Becks, Hermann. Salivary and bacteriologic considerations in the control of dental caries. Am. Col. Dent. J., 9:184–90, June 1942. Christie, Amos. Diet to reduce L. acidophilus content of saliva: a pediatrician comments. Calif. S. Dent. A. J., 16:185–9, Sept.–Oct. 1940.

(4) What is the effect of starches on the caries attack rate?
Ans.—Sugars, as such, are far more effective in producing dental caries than are starches. In some individuals it is necessary to restrict the starchy foods as well as free sugar in order to obtain favorable results in the control of the dental caries attack rate.

Ref: Jay, Philip. Nutrition and dental caries. N. J. S. Dent. Soc. J., 15:20–4, Jan. 1944.

(5) What effect have salivary enzymes on dental caries?
Ans.—The enzymes perform one of the first steps of the digestion of foods, changing the starches to sugar in the mouth. These enzymes produce a fermentation reaction. A rapid acid formation is created by an optimal enzyme system which involves all enzymes. The salivary enzymes, being one group of the optimal system, will have little if any, effect on dental caries. The saliva has a buffer quality which prevents it from becoming too acid or too alkaline.

Ref: Fosdick, L. S. The etiology and control of dental caries. Am. Dent. A. J., 29:2132-9, Dec. 1942.
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